

**TEST REPORT**  
On behalf of

Savant Technologies LLC, dba GE Lighting, a Savant company

Product Name: Cync Tile

Model No.: CFIXTIHC DEN

FCC ID: PUU-TILE-CDEN

Prepared For: Savant Technologies LLC, dba GE Lighting, a Savant company  
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Prepared By: Audix Technology (Shanghai) Co., Ltd.  
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File No. : C1D2211024  
Report No. : ACI-F23012  
Date of Test : 2022.11.24-2023.01.06  
Date of Report : 2023.01.31

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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# TEST REPORT

Applicant : Savant Technologies LLC, dba GE Lighting, a Savant company  
 EUT Description : Cync Tile  
 (A) Model No. : Refer to Sec.2.1  
 (B) Power Supply : 120V AC 60Hz  
 (C) Test Voltage : 120V/60Hz

### Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART C  
 AND ANSI C63.10-2013*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT (M/N: Refer to Sec2.1), which was tested is technically compliance with the FCC limits.

This report applies to above tested Sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

*The test results for EUT's BLE function are contained in No.ACI-F23011 report.*

Date of Test : 2022.11.24-2023.01.06 Date of Report : 2023.01.31

Producer : Mindy Wang  
 MINDY WANG / Assistant

Review : Byron Wu  
 BYRON WU / Deputy Assistant Manager  
 For and on behalf of  
**AUDIX®**  
 Audix Technology (Shanghai) Co., Ltd.

Signatory : Kamp Chen  
 Authorized Signature(s) KAMPCHEN / Manager

# 1 SUMMARY OF STANDARDS AND RESULTS

## 1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Results	Meets Limit
<b>EMISSION</b>			
Conducted Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.207
Radiated Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.209(a) 15.205(a)(c)
6 dB Bandwidth Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(a)(2)
Maximum Peak Output Power Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(b)(3)
Emission Limitations Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(d)
Band Edge Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(d)
Power Spectral Density Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(e)
Antenna Requirement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.203
N/A is an abbreviation for Not Applicable.			

## 2 GENERAL INFORMATION

### 2.1 Description of Equipment Under Test

Description : Cync Tile

Type of EUT :  Production  Pre-product  Pro-type

Model Number : CFIXTIHC DEN

Radio Tech : BLE 4.2;  
IEEE 802.11 b/g/n.

Note: : 802.11n-HT40 not support.

Channel Freq. : BLE: 2402MHz-2480MHz;  
802.11b/g/n: 2412MHz-2462MHz.

Modulation : BLE: GFSK;  
802.11b: DSSS (CCK, DQPSK, DBPSK);  
802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK).

Antenna Info. : Antenna Type: PCB Antenna  
Antenna Gain: 2.31 dBi

Applicant : Savant Technologies LLC, dba GE Lighting, a Savant company  
1975 Noble Road, Cleveland, OH 44112

Manufacturer : same as Applicant

Factory #1 : LEEDARSON LIGHTING CO LTD.  
XINGDA RD, XINGTAI INDUSTRIAL ZONE,  
CHANGTAI COUNTY, ZHANGZHOU, FUJIAN  
363900 CHINA.

Factory #2 : LEEDARSON IOT TECHNOLOGY (THAILAND)  
CO., LTD.  
71 Moo.5 T. Bang Samak(Building A) , Wellgrow  
Industrial Estate, A.Bang Pakong District,  
Chachoengsao province, 24130 Thailand

## 2.2 EUT Specifications Assessed in Current Report

Mode	Modulation	Data Rate(Mbps)
802.11b	DS (DQPSK, DBPSK, CCK)	Up to 11
802.11g	OFDM (64-QAM, 16-QAM, QPSK, BPSK)	Up to 54
802.11n-HT 20	OFDM (64-QAM, 16-QAM, QPSK, BPSK)	Up to 72.2
802.11n-HT 40	OFDM (64-QAM, 16-QAM, QPSK, BPSK)	Up to 150

Channel List			
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

## 2.3 Test Information

The test software “UI\_mptool.exe” was used to control EUT work in TX mode, Power Index and select test channel.

Modulation	data rate (Mbps)	Test Channel		Frequency (MHz)
802.11b	11	Low:	1	2412
		Middle:	6	2437
		High:	11	2462
802.11g	6	Low:	1	2412
		Middle:	6	2437
		High:	11	2462
802.11n20	MCS0	Low:	1	2412
		Middle:	6	2437
		High:	11	2462

## 2.4 Sample Description

Test Item	Model Number	Sample Number	Date of receipted
Conducted Emission	CFIXTIHCDEN	E2211822-01/03	2022.11.08
Radiated Emission	CFIXTIHCDEN	E2211822a-02/03	2022.11.08
Conducted RF Test	CFIXTIHCDEN	E2211822a-01/03	2022.11.08

## 2.5 Supported equipment

Brand : Acer  
Product Name: : Notebook PC  
Model Name : TravelMate P238 series  
Model Number : N15W8

Product Name : Test Fixture  
Product Function : USB to TTL

## 2.6 Description of Test Facility

Name of Firm : Audix Technology (Shanghai) Co., Ltd.

Site Location : 3F and 4F, 34Bldg, 680 Guiping Rd.,  
Caohejing Hi-Tech Park,  
Shanghai 200233, China.

Accredited by NVLAP, Lab Code : 200371-0

FCC Designation Number : CN5027

Test Firm Registration Number : 954668



### 3 CONDUCTED EMISSION TEST

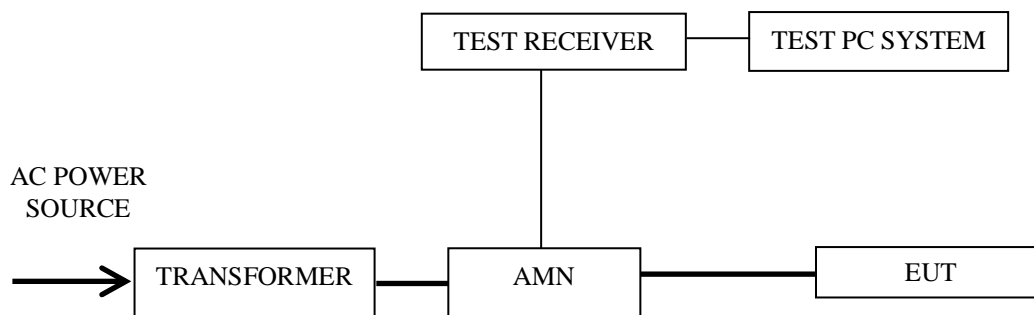
#### 3.1 Test Equipment

The following test equipments are used during the conducted emission test in a shielded room:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESCI	101302	2022.06.07	1 Year
2.	Artificial Mains Network (AMN)	R&S	ENV216	101514	2022.09.23	1 Year
3.	Software	Audix	e3	6.2009-1-15	--	--

#### 3.2 Block Diagram of Test Setup

##### 3.2.1 Conducted Disturbance Test Setup



— : Signal Line  
 — : Power Line

### 3.3 Conducted Emission Limits (§15.207)

Frequency Range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66~56	56~46
0.5 ~ 5	56	46
5 ~ 30	60	50
NOTE 1 – The lower limit shall apply at the transition frequencies. NOTE 2 – The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz~0.50 MHz		

### 3.4 Test Configuration

The EUT (listed in Sec.2.1) was installed as shown on Sec.3.2 to meet FCC requirement and operating in a manner which tends to maximize its emission level in a normal application.

### 3.5 Operating Condition of EUT

- 3.5.1 Setup the EUT as shown in Sec. 3.2.
- 3.5.2 Turn on the power of all equipment.
- 3.5.3 Turn the EUT on the test mode, and then test.

### 3.6 Test Procedures

The EUT was placed upon a non-metallic table, which is 0.8 m above the horizontal conducting ground plane and 0.4 m from a vertical reference plane. The EUT was connected to the power mains through an Artificial Mains Network (AMN) to provide a 50 Ω coupling impedance for the measuring equipment. Both sides of AC line (Line & Neutral) were checked to find out the maximum conducted emission according to FCC Part 15 Subpart C and ANSI C63.10: 2013 requirements during conducted disturbance test.

The I.F. bandwidth of Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

Test with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. (According to KDB 174176 D01 Line Conducted FAQ)

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.7

### 3.7 Test Results

< **PASS** >

The frequency and amplitude of the highest conducted emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

Worst case emission:

No.	Operation	Modulation	Channel	Frequency (MHz)	Data Page
1.	Transmitting	802.11b	1	2412	P12

NOTE 1 – Level = Read Level + AMN Factor + Cable Loss

NOTE 2 – “QP” means “Quasi-Peak” values

NOTE 3 – The emission levels which not reported are too low against the official limit.

**Worst case emission**

EUT : Cync Tile Temperature : 22°C  
 Model No. : CFIXTIHCDEN Humidity : 51%RH  
 Test Mode : Transmitting Date of Test : 2023.01.16

Polarization	Frequency (MHz)	Meter Reading dB (µV)	AMN Factor (dB)	Cable Loss (dB)	Emission Level dB (µV)	Limits dB (µV)	Margin (dB)	Remark
Line	0.1942	42.1	9.7	0.03	51.83	63.85	12.02	QP
	0.1942	28.4	9.7	0.03	38.13	53.85	15.72	Average
	0.2017	41	9.7	0.03	50.73	63.54	12.81	QP
	0.2017	28.8	9.7	0.03	38.53	53.54	15.01	Average
	0.2558	40.9	9.7	0.03	50.63	61.57	10.94	QP
	0.2558	25.6	9.7	0.03	35.33	51.57	16.24	Average
	0.2712	38.7	9.7	0.03	48.43	61.08	12.65	QP
	0.2712	24.2	9.7	0.03	33.93	51.08	17.15	Average
	0.324	33.5	9.75	0.03	43.28	59.6	16.32	QP
	0.324	18	9.75	0.03	27.78	49.6	21.82	Average
	0.3859	33.8	9.73	0.04	43.57	58.15	14.58	QP
	0.3859	19.4	9.73	0.04	29.17	48.15	18.98	Average
Neutral	0.1928	39.2	9.7	0.03	48.93	63.92	14.99	QP
	0.1928	26	9.7	0.03	35.73	53.92	18.19	Average
	0.2066	37.4	9.7	0.03	47.13	63.34	16.21	QP
	0.2066	21.8	9.7	0.03	31.53	53.34	21.81	Average
	0.2566	37.5	9.7	0.03	47.23	61.54	14.31	QP
	0.2566	25.5	9.7	0.03	35.23	51.54	16.31	Average
	0.2684	37.1	9.7	0.03	46.83	61.17	14.34	QP
	0.2684	25.8	9.7	0.03	35.53	51.17	15.64	Average
	0.3937	29.7	9.71	0.04	39.45	57.99	18.54	QP
	0.3937	18.9	9.71	0.04	28.65	47.99	19.34	Average
0.413	29.3	9.7	0.04	39.04	57.59	18.55	QP	
0.413	14.8	9.7	0.04	24.54	47.59	23.05	Average	

TEST ENGINEER: Jarey

## 4 RADIATED EMISSION TEST

### 4.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

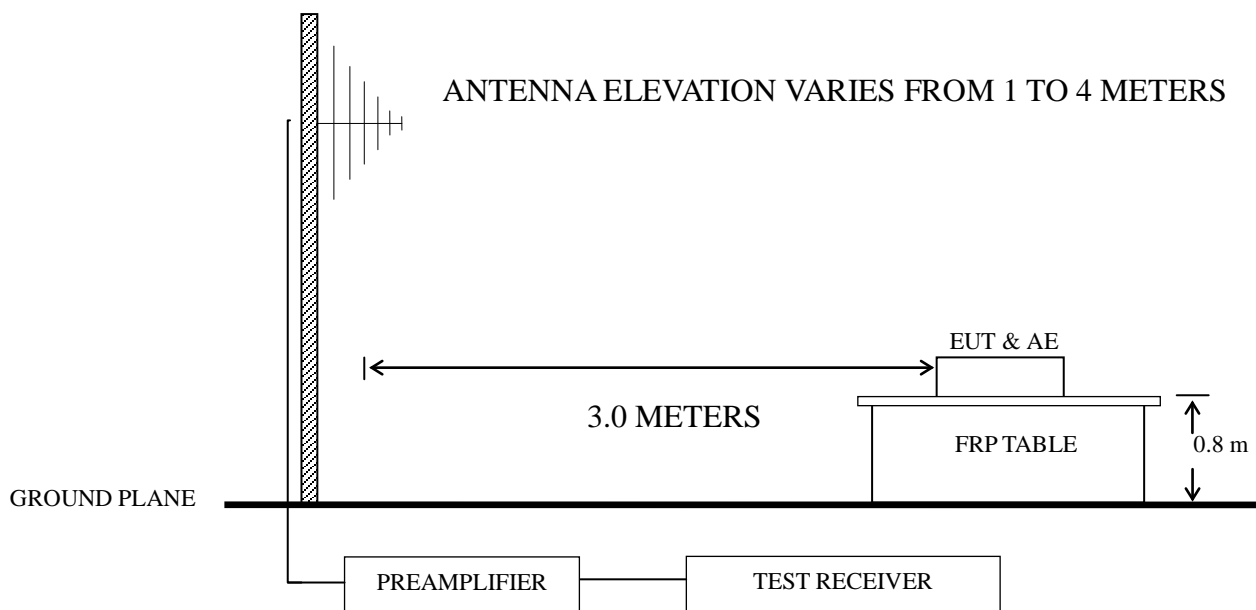
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Preamplifier	Agilent	8447D	2944A10548	2022.06.06	1 Year
2.	Preamplifier	HP	8449B	3008A00864	2022.06.06	1 Year
3.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2022.09.15	1 Year
4.	Test Receiver	R&S	ESCI	101303	2022.06.06	1 Year
5.	Bilog Antenna+6dB Attenuator	Schwarz beck	VULB 9168+EMCI-N-6-06	707+AT-N0637	2022.07.25	1 Year
6.	Horn Antenna	EMCO	3115	9607-4878	2022.07.27	1 Year
7.	Horn Antenna	EMCO	3116	00062643	2021.12.13	2 Year
8.	Cavity Band Rejection Filter	Microwave	WT-A3882-R10	WT200312-1-1	2022.06.06	1 Year
9.	Software	Audix	e3	SET00200 9912M295-2	--	--

### 4.2 Block Diagram of Test Setup

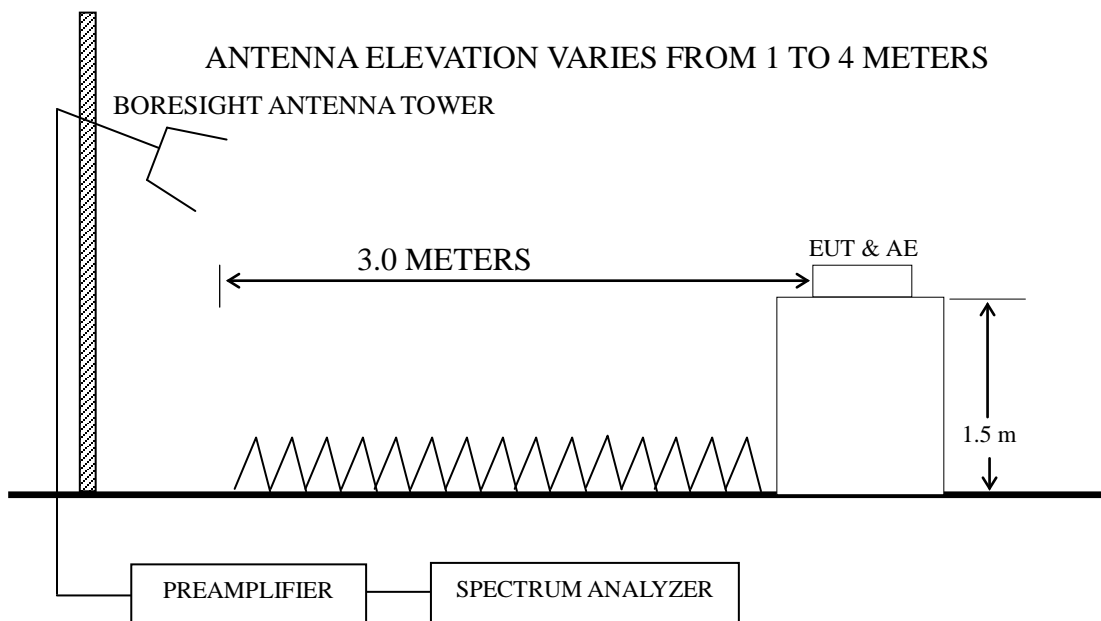
#### 4.2.1 EUT & Peripherals



#### 4.2.2 Below 1GHz



4.2.3 Above 1GHz



4.3 Radiated Emission Limit (§15.209)

Frequency (MHz)	Distance (m)	Field strength limits ( $\mu\text{V/m}$ )	
		( $\mu\text{V/m}$ )	dB( $\mu\text{V/m}$ )
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

NOTE 1 - Emission Level dB ( $\mu\text{V/m}$ ) = 20 log Emission Level ( $\mu\text{V/m}$ )  
 NOTE 2 - The tighter limit applies at the band edges.  
 NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.  
 NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.  
 NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

4.4 Test Configuration

The EUT (listed in Sec.2.1) and the simulators (listed in Sec.2.2) were installed as shown on Sec.4.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

## 4.5 Operating Condition of EUT

4.5.1 Setup the EUT as shown in Sec. 4.2.

4.5.2 Turn on the power of all equipment.

4.5.3 Connect the HCI of EUT and Notebook PC through Test fixture, use the software as section 2.3 to change test mode, then remove the test fixture and notebook PC. Then test.

4.5.4 Repeat the step 4.5.3, until all test mode finished.

## 4.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable. Below 1 GHz, the table height is 80 cm above the reference ground plane. Above 1 GHz, the table height is 1.5 m. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.10: 2013 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESCI was set at 120 kHz from 30MHz to 1000MHz.

The bandwidth of Agilent N9010A was set at 1MHz for above 1GHz.

The frequency range from 30 MHz to 25 GHz (Up to 10<sup>th</sup> harmonics from fundamental frequency) was checked.

All the test results are listed in Sec.4.7.

## 4.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

Frequency range: below 1GHz (Worst case emission)

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	11	2462 MHz	P18
2.		802.11g	11	2462 MHz	P18
3.		802.11n20	11	2462 MHz	P19

Frequency range: above 1GHz

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	1	2412 MHz	P20
2.			6	2437 MHz	P20
3.			11	2462 MHz	P21
4.		802.11g	11	2462 MHz	P21
5.		802.11n20	11	2462 MHz	P22

Band-Edge:

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	1	2412 MHz	P23
2.			11	2462 MHz	P23
3.		802.11g	1	2412 MHz	P23
4.			11	2462 MHz	P24
5.		802.11n20	1	2412 MHz	P24
6.			11	2462 MHz	P24

Restricted bands:

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	1	2412 MHz	P25
2.			9	2447 MHz	P25
3.			11	2462 MHz	P26
4.		802.11g	1	2412 MHz	P27
5.			11	2462 MHz	P27
6.		802.11n20	1	2412 MHz	P28
7.			11	2462 MHz	P28



- NOTE 1 – Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
- NOTE 2 – “QP” means “Quasi-Peak” values
- NOTE 3 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.
- NOTE 4 – The emission levels which not reported are too low against the official limit.
- NOTE 5 – The emission levels recorded below is data of EUT configured in Lying direction, for this direction was the maximum emission direction during the test. The data of Side & Standing direction are too low against the official limit to be reported.
- NOTE 6 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.  
For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.
- NOTE 7 – The frequency range 2310-2390MHz & 2483.5-2500MHz were tested for Restricted bands.

**Worst case emission < 1GHz**

EUT : Cync Tile Temperature : 22°C  
 Model No. : CFIXTIHC DEN Humidity : 51%RH  
 Test Mode : Transmitting Date of Test : 2022.11.29

**802.11b CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB (µV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (µV/m)	Limits dB (µV/m)	Margin (dB)	Remark
Horizontal	53.693	24.5	19.53	0.78	28.18	16.63	40	23.37	QP
	117.77	33.99	16.83	1.18	27.91	24.09	43.5	19.41	QP
	143.83	32.94	19.1	1.29	27.82	25.51	43.5	17.99	QP
	302.48	36.47	19.35	1.92	27.02	30.72	46	15.28	QP
	330.2	39.09	20.2	1.97	27.19	34.07	46	11.93	QP
	537.59	30.91	23.95	2.52	27.9	29.48	46	16.52	QP
Vertical	34.396	35.19	18.76	0.61	28.27	26.29	40	13.71	QP
	117.77	37.13	16.83	1.18	27.91	27.23	43.5	16.27	QP
	143.83	36.54	19.1	1.29	27.82	29.11	43.5	14.39	QP
	202.1	39.48	16.21	1.57	27.38	29.88	43.5	13.62	QP
	304.61	38.54	19.4	1.93	27.04	32.83	46	13.17	QP
	331.36	38.67	20.2	1.98	27.21	33.64	46	12.36	QP

**802.11g CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB (µV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (µV/m)	Limits dB (µV/m)	Margin (dB)	Remark
Horizontal	50.409	23.94	19.6	0.76	28.2	16.1	40	23.9	QP
	117.77	33.86	16.83	1.18	27.91	23.96	43.5	19.54	QP
	144.34	32.4	19.1	1.29	27.82	24.97	43.5	18.53	QP
	302.48	35.99	19.35	1.92	27.02	30.24	46	15.76	QP
	332.52	39.16	20.2	1.98	27.21	34.13	46	11.87	QP
	457.51	32.26	23.05	2.32	27.82	29.81	46	16.19	QP
Vertical	33.917	35.29	18.8	0.61	28.28	26.42	40	13.58	QP
	118.19	37.97	16.8	1.18	27.91	28.04	43.5	15.46	QP
	147.4	36.39	19.15	1.3	27.81	29.03	43.5	14.47	QP
	200.69	39.76	16.27	1.57	27.39	30.21	43.5	13.29	QP
	301.42	39.26	19.32	1.92	27.02	33.48	46	12.52	QP
	330.2	37.83	20.2	1.97	27.19	32.81	46	13.19	QP

**802.11n20 CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB (µV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (µV/m)	Limits dB (µV/m)	Margin (dB)	Remark
Horizontal	45.535	24.17	19.45	0.72	28.22	16.12	40	23.88	QP
	117.77	34.32	16.83	1.18	27.91	24.42	43.5	19.08	QP
	143.83	32.07	19.1	1.29	27.82	24.64	43.5	18.86	QP
	302.48	36.78	19.35	1.92	27.02	31.03	46	14.97	QP
	330.2	39.77	20.2	1.97	27.19	34.75	46	11.25	QP
	459.11	31.41	23.08	2.32	27.82	28.99	46	17.01	QP
Vertical	34.396	34.57	18.76	0.61	28.27	25.67	40	14.33	QP
	117.77	37.53	16.83	1.18	27.91	27.63	43.5	15.87	QP
	146.89	36.49	19.1	1.3	27.81	29.08	43.5	14.42	QP
	197.89	39.56	16.4	1.55	27.42	30.09	43.5	13.41	QP
	302.48	38.38	19.35	1.92	27.02	32.63	46	13.37	QP
	330.2	38.49	20.2	1.97	27.19	33.47	46	12.53	QP

TEST ENGINEER: Jarey

**Radiated Emission > 1GHz**

EUT : Cync Tile Temperature : 22°C  
 Model No. : CFIXTIHCDEN Humidity : 51%RH  
 Test Mode : Transmitting Date of Test : 2022.11.29-12.09

**802.11b CH2412MHz**

Polarization	Frequency (MHz)	Meter Reading dB (µV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (µV/m)	Limits dB (µV/m)	Margin (dB)	Remark
Horizontal	3484	42.5	31.28	6.36	35.14	45	74	29	Peak
	4624	39.95	32.47	7.36	34.81	44.97	74	29.03	Peak
	5668	38.74	34.17	8.14	34.7	46.35	74	27.65	Peak
	7480	38.11	36.75	9.69	34.8	49.75	74	24.25	Peak
	8896	37.1	38.28	10.64	34.71	51.31	74	22.69	Peak
	10696	36.95	38.49	11.55	34.46	52.53	74	21.47	Peak
Vertical	3568	41.29	31.48	6.4	35.12	44.05	74	29.95	Peak
	5044	38.79	34.01	7.73	34.7	45.83	74	28.17	Peak
	6376	39.51	34.38	8.68	34.74	47.83	74	26.17	Peak
	7876	37.25	37.5	10.11	34.8	50.06	74	23.94	Peak
	9148	37.59	38.23	10.79	34.68	51.93	74	22.07	Peak
	10516	37.68	38.3	11.51	34.5	52.99	74	21.01	Peak

**802.11b CH2437MHz**

Polarization	Frequency (MHz)	Meter Reading dB (µV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (µV/m)	Limits dB (µV/m)	Margin (dB)	Remark
Horizontal	3520	41.21	31.35	6.4	35.13	43.83	74	30.17	Peak
	5164	38.99	34.03	7.83	34.7	46.15	74	27.85	Peak
	6808	37.41	35.17	9.09	34.78	46.89	74	27.11	Peak
	8644	37.92	38.48	10.52	34.73	52.19	74	21.81	Peak
	9808	36.51	38.36	11.24	34.62	51.49	74	22.51	Peak
	11200	36.22	38.8	11.76	34.36	52.42	74	21.58	Peak
Vertical	3784	40.4	31.99	6.62	35.06	43.95	74	30.05	Peak
	5176	38.71	34.04	7.83	34.7	45.88	74	28.12	Peak
	6580	37.98	34.59	8.93	34.76	46.74	74	27.26	Peak
	8092	37.91	37.87	10.28	34.79	51.27	74	22.73	Peak
	9604	36.57	38.32	11.15	34.64	51.4	74	22.6	Peak
	11056	36.33	38.8	11.64	34.39	52.38	74	21.62	Peak

**802.11b CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)	Remark
Horizontal	3556	41.86	31.45	6.4	35.12	44.59	74	29.41	Peak
	5140	39	34.03	7.83	34.7	46.16	74	27.84	Peak
	6856	38.06	35.26	9.09	34.79	47.62	74	26.38	Peak
	8068	37.69	37.83	10.28	34.79	51.01	74	22.99	Peak
	9712	37.73	38.34	11.15	34.63	52.59	74	21.41	Peak
	10948	36.7	38.74	11.64	34.41	52.67	74	21.33	Peak
Vertical	3808	40.45	32.07	6.62	35.05	44.09	74	29.91	Peak
	5044	38.8	34.01	7.73	34.7	45.84	74	28.16	Peak
	6544	39.1	34.5	8.85	34.76	47.69	74	26.31	Peak
	8212	37.88	38.09	10.34	34.78	51.53	74	22.47	Peak
	9328	37.16	38.27	10.97	34.67	51.73	74	22.27	Peak
	10876	36.74	38.67	11.6	34.43	52.58	74	21.42	Peak

**802.11g CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)	Remark
Horizontal	3592	41.5	31.53	6.44	35.11	44.36	74	29.64	Peak
	5164	38.99	34.03	7.83	34.7	46.15	74	27.85	Peak
	6412	39.31	34.38	8.76	34.74	47.71	74	26.29	Peak
	8092	38.07	37.87	10.28	34.79	51.43	74	22.57	Peak
	9364	37.42	38.27	10.97	34.66	52	74	22	Peak
	10888	36.65	38.67	11.6	34.42	52.5	74	21.5	Peak
Vertical	3772	40.84	31.96	6.58	35.06	44.32	74	29.68	Peak
	5368	38.6	34.07	7.99	34.7	45.96	74	28.04	Peak
	6976	37.63	35.55	9.26	34.8	47.64	74	26.36	Peak
	8200	37	38.09	10.34	34.78	50.65	74	23.35	Peak
	9700	37.29	38.34	11.15	34.63	52.15	74	21.85	Peak
	11224	36.66	38.8	11.76	34.35	52.87	74	21.13	Peak

**802.11n20 CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	3688	42	31.79	6.53	35.09	45.23	74	28.77	Peak
	4924	40.18	33.72	7.67	34.72	46.85	74	27.15	Peak
	6208	38.48	34.34	8.6	34.72	46.7	74	27.3	Peak
	7888	37.88	37.54	10.11	34.8	50.73	74	23.27	Peak
	9328	37.02	38.27	10.97	34.67	51.59	74	22.41	Peak
	11272	36.02	38.8	11.87	34.35	52.34	74	21.66	Peak
Vertical	3508	41.87	31.33	6.36	35.14	44.42	74	29.58	Peak
	5032	39.27	34.01	7.73	34.7	46.31	74	27.69	Peak
	6748	38.06	35.02	9.01	34.78	47.31	74	26.69	Peak
	8440	36.51	38.51	10.46	34.75	50.73	74	23.27	Peak
	9724	36.82	38.34	11.24	34.63	51.77	74	22.23	Peak
	11212	36.04	38.8	11.76	34.35	52.25	74	21.75	Peak

TEST ENGINEER: Jarey

**Band-Edge:**

EUT : Cync Tile Temperature : 22°C

Model No. : CFIXTIHCDEN Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2022.11.29-12.09

**802.11b CH2412MHz**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2390	53.62	28.21	5.36	35.86	51.33	74	22.67	Peak
	2390	41.92	28.21	5.36	35.86	39.63	54	14.37	Average
Vertical	2390	48.24	28.21	5.36	35.86	45.95	74	28.05	Peak
	2390	37.54	28.21	5.36	35.86	35.25	54	18.75	Average

**802.11b CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2483.5	52.67	28.46	5.43	35.76	50.8	74	23.2	Peak
	2483.5	42.05	28.46	5.43	35.76	40.18	54	13.82	Average
Vertical	2483.5	48.2	28.46	5.43	35.76	46.33	74	27.67	Peak
	2483.5	36.93	28.46	5.43	35.76	35.06	54	18.94	Average

**802.11g CH2412MHz**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2390	61.55	28.21	5.36	35.86	59.26	74	14.74	Peak
	2390	49.14	28.21	5.36	35.86	46.85	54	7.15	Average
Vertical	2390	53.47	28.21	5.36	35.86	51.18	74	22.82	Peak
	2390	44.99	28.21	5.36	35.86	42.7	54	11.3	Average

**802.11g CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2483.5	68.39	28.46	5.43	35.76	66.52	74	7.48	Peak
	2483.5	49.28	28.46	5.43	35.76	47.41	54	6.59	Average
Vertical	2483.5	56.88	28.46	5.43	35.76	55.01	74	18.99	Peak
	2483.5	40.98	28.46	5.43	35.76	39.11	54	14.89	Average

**802.11n20 CH2412MHz**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2390	66.73	28.21	5.36	35.86	64.44	74	9.56	Peak
	2390	50.47	28.21	5.36	35.86	48.18	54	5.82	Average
Vertical	2390	54.41	28.21	5.36	35.86	52.12	74	21.88	Peak
	2390	43.64	28.21	5.36	35.86	41.35	54	12.65	Average

**802.11n20 CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2483.5	64.42	28.46	5.43	35.76	62.55	74	11.45	Peak
	2483.5	52.05	28.46	5.43	35.76	50.18	54	3.82	Average
Vertical	2483.5	58.94	28.46	5.43	35.76	57.07	74	16.93	Peak
	2483.5	44.94	28.46	5.43	35.76	43.07	54	10.93	Average



**Emissions in restricted frequency bands:**

EUT : Cync Tile Temperature : 22°C  
 Model No. : CFIXTIHCDEN Humidity : 51%RH  
 Test Mode : Transmitting Date of Test : 2022.11.29-12.09

**802.11b CH2412MHz**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2336.8	50.63	28.08	5.29	35.92	48.08	74	25.92	Peak
	2336.8	38.37	28.08	5.29	35.92	35.82	54	18.18	Average
	2361.7	51.1	28.14	5.32	35.89	48.67	74	25.33	Peak
	2361.7	39.31	28.14	5.32	35.89	36.88	54	17.12	Average
	2386	55.48	28.21	5.36	35.87	53.18	74	20.82	Peak
	2386	43.65	28.21	5.36	35.87	41.35	54	12.65	Average
Vertical	2326.6	49.89	28.05	5.29	35.93	47.3	74	26.7	Peak
	2326.6	37.59	28.05	5.29	35.93	35	54	19	Average
	2351.5	50.05	28.12	5.32	35.9	47.59	74	26.41	Peak
	2351.5	37.41	28.12	5.32	35.9	34.95	54	19.05	Average
	2373.3	51.03	28.17	5.32	35.88	48.64	74	25.36	Peak
	2373.3	38.21	28.17	5.32	35.88	35.82	54	18.18	Average

**802.11b CH2447MHz**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2484.9	52.79	28.46	5.47	35.76	50.96	74	23.04	Peak
	2484.9	41.37	28.46	5.47	35.76	39.54	54	14.46	Average
	2490.6	51.9	28.48	5.47	35.76	50.09	74	23.91	Peak
	2490.6	40.65	28.48	5.47	35.76	38.84	54	15.16	Average
	2497.9	51.98	28.5	5.47	35.76	50.19	74	23.81	Peak
	2497.9	40.4	28.5	5.47	35.76	38.61	54	15.39	Average
Vertical	2485.3	48.91	28.46	5.47	35.76	47.08	74	26.92	Peak
	2485.3	36.59	28.46	5.47	35.76	34.76	54	19.24	Average
	2490.5	49.81	28.48	5.47	35.76	48	74	26	Peak
	2490.5	36.38	28.48	5.47	35.76	34.57	54	19.43	Average
	2496.1	49.56	28.48	5.47	35.76	47.75	74	26.25	Peak
	2496.1	37.16	28.48	5.47	35.76	35.35	54	18.65	Average

**802.11b CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2484.1	53.92	28.46	5.43	35.76	52.05	74	21.95	Peak
	2484.1	41.59	28.46	5.43	35.76	39.72	54	14.28	Average
	2487.8	54.62	28.46	5.47	35.76	52.79	74	21.21	Peak
	2487.8	43.36	28.46	5.47	35.76	41.53	54	12.47	Average
	2497.5	52.79	28.5	5.47	35.76	51	74	23	Peak
	2497.5	40.58	28.5	5.47	35.76	38.79	54	15.21	Average
Vertical	2486	49.3	28.46	5.47	35.76	47.47	74	26.53	Peak
	2486	37.33	28.46	5.47	35.76	35.5	54	18.5	Average
	2492.1	49.77	28.48	5.47	35.76	47.96	74	26.04	Peak
	2492.1	36.38	28.48	5.47	35.76	34.57	54	19.43	Average
	2497.9	49.38	28.5	5.47	35.76	47.59	74	26.41	Peak
	2497.9	36.54	28.5	5.47	35.76	34.75	54	19.25	Average

**802.11g CH2412MHz**

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)	Remark
Horizontal	2330.1	55.92	28.06	5.29	35.93	53.34	74	20.66	Peak
	2330.1	43.5	28.06	5.29	35.93	40.92	54	13.08	Average
	2355.9	55.95	28.12	5.32	35.9	53.49	74	20.51	Peak
	2355.9	44.5	28.12	5.32	35.9	42.04	54	11.96	Average
	2389.3	63.56	28.21	5.36	35.86	61.27	74	12.73	Peak
	2389.3	48.55	28.21	5.36	35.86	46.26	54	7.74	Average
Vertical	2332.2	53.4	28.06	5.29	35.93	50.82	74	23.18	Peak
	2332.2	41.45	28.06	5.29	35.93	38.87	54	15.13	Average
	2370.1	52.92	28.17	5.32	35.89	50.52	74	23.48	Peak
	2370.1	41.6	28.17	5.32	35.89	39.2	54	14.8	Average
	2388.8	54.65	28.21	5.36	35.86	52.36	74	21.64	Peak
	2388.8	44.36	28.21	5.36	35.86	42.07	54	11.93	Average

**802.11g CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)	Remark
Horizontal	2484.3	68.2	28.46	5.47	35.76	66.37	74	7.63	Peak
	2484.3	49.02	28.46	5.47	35.76	47.19	54	6.81	Average
	2490.3	57.88	28.48	5.47	35.76	56.07	74	17.93	Peak
	2490.3	44.68	28.48	5.47	35.76	42.87	54	11.13	Average
	2496.3	56.27	28.5	5.47	35.76	54.48	74	19.52	Peak
	2496.3	43.53	28.5	5.47	35.76	41.74	54	12.26	Average
Vertical	2484.1	59.83	28.46	5.43	35.76	57.96	74	16.04	Peak
	2484.1	40.38	28.46	5.43	35.76	38.51	54	15.49	Average
	2492.5	49.99	28.48	5.47	35.76	48.18	74	25.82	Peak
	2492.5	38.5	28.48	5.47	35.76	36.69	54	17.31	Average
	2496.8	49.73	28.5	5.47	35.76	47.94	74	26.06	Peak
	2496.8	38.57	28.5	5.47	35.76	36.78	54	17.22	Average

**802.11n20 CH2412MHz**

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)	Remark
Horizontal	2326.3	59.7	28.05	5.29	35.93	57.11	74	16.89	Peak
	2326.3	47.47	28.05	5.29	35.93	44.88	54	9.12	Average
	2358.1	59.67	28.14	5.32	35.89	57.24	74	16.76	Peak
	2358.1	47.47	28.14	5.32	35.89	45.04	54	8.96	Average
	2388.9	66.79	28.21	5.36	35.86	64.5	74	9.5	Peak
	2388.9	50.38	28.21	5.36	35.86	48.09	54	5.91	Average
Vertical	2327.3	53.83	28.05	5.29	35.93	51.24	74	22.76	Peak
	2327.3	42.38	28.05	5.29	35.93	39.79	54	14.21	Average
	2358.1	54.51	28.14	5.32	35.89	52.08	74	21.92	Peak
	2358.1	42.55	28.14	5.32	35.89	40.12	54	13.88	Average
	2389.4	58.8	28.21	5.36	35.86	56.51	74	17.49	Peak
	2389.4	44.38	28.21	5.36	35.86	42.09	54	11.91	Average

**802.11n20 CH2462MHz**

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)	Remark
Horizontal	2484.5	66.72	28.46	5.47	35.76	64.89	74	9.11	Peak
	2484.5	51.47	28.46	5.47	35.76	49.64	54	4.36	Average
	2492	59.89	28.48	5.47	35.76	58.08	74	15.92	Peak
	2492	47.59	28.48	5.47	35.76	45.78	54	8.22	Average
	2497.2	60.46	28.5	5.47	35.76	58.67	74	15.33	Peak
	2497.2	47.65	28.5	5.47	35.76	45.86	54	8.14	Average
Vertical	2483.6	61.71	28.46	5.43	35.76	59.84	74	14.16	Peak
	2483.6	44.89	28.46	5.43	35.76	43.02	54	10.98	Average
	2488.1	54.83	28.46	5.47	35.76	53	74	21	Peak
	2488.1	42.48	28.46	5.47	35.76	40.65	54	13.35	Average
	2495.4	54.85	28.48	5.47	35.76	53.04	74	20.96	Peak
	2495.4	42.69	28.48	5.47	35.76	40.88	54	13.12	Average

TEST ENGINEER: Jarey

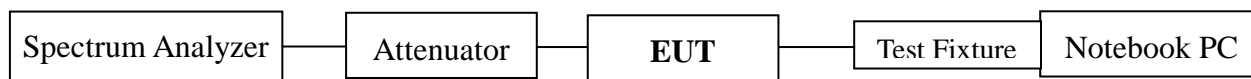
## 5 99% OCCUPIED BANDWIDTH MEASUREMENT

### 5.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2022.09.15	1 Year
2.	Coaxial Cable	WOKEN	SFL402-105F LEX	F02-150819-045	2022.03.07	1 Year
3.	20 dB Attenuator	Mini-Circuits	VAT-20+	001	2022.08.06	1 Year

### 5.2 Block Diagram of Test Setup



### 5.3 Operating Condition of EUT

The software as section 2.3 was used to enable the EUT to change the test mode one by one.

### 5.4 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of 99% power bandwidth was measure by spectrum analyzer with settings: Span = between 1.5 times and 5.0 times of the OBW, RBW = 1% to 5% of the OBW, VBW  $\geq 3 \times$  RBW, Detector = Peak, Trace = Max Hold.

Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

The test procedure is defined in ANSI C63.10-2013 (the 6.9.3 Measurement Procedure “Occupied bandwidth—power bandwidth (99%) measurement procedure” was used).

### 5.5 Test Results

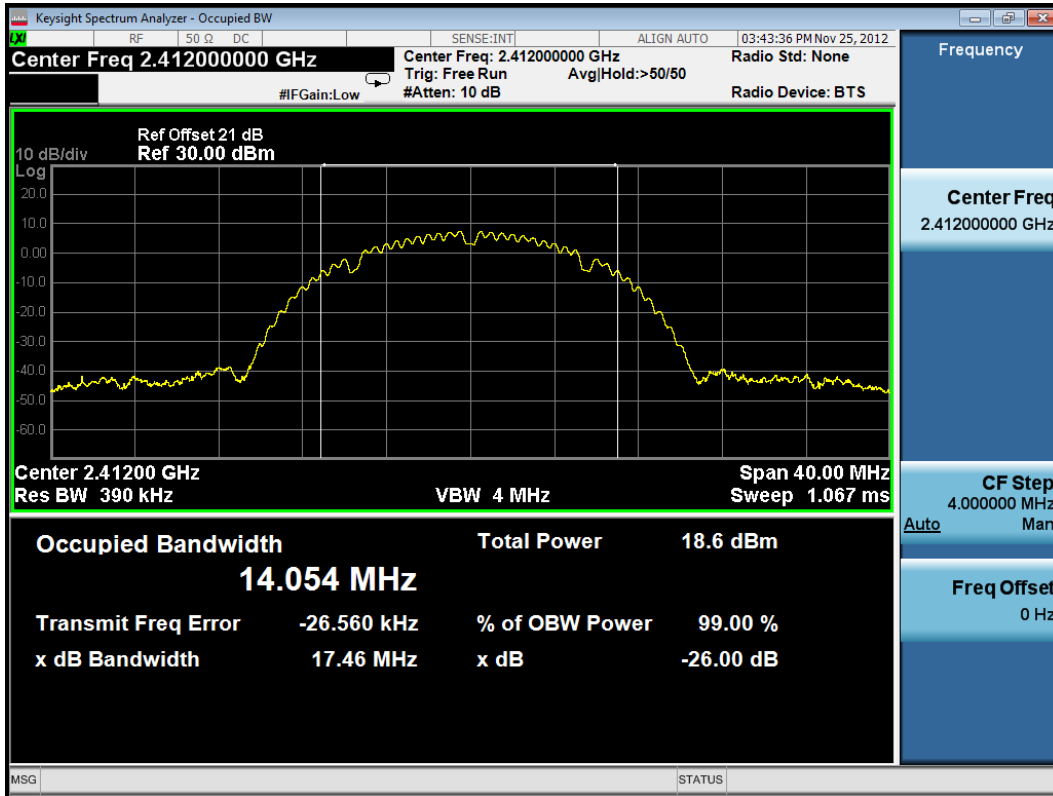
#### **PASSED.**

All the test results are attached in next pages.

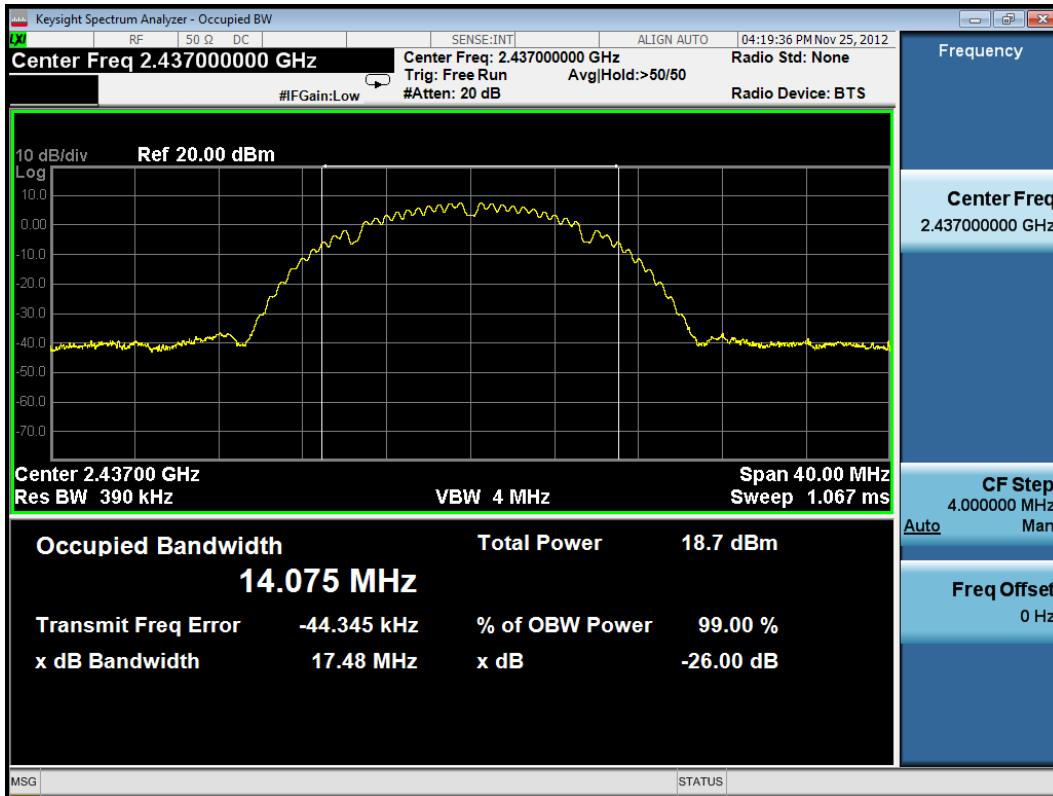
(Test Date: 2022.11.24-25 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	99% Bandwidth (MHz)
802.11b	1	2412	<b>14.054</b>
	6	2437	<b>14.075</b>
	11	2462	<b>14.082</b>
802.11g	1	2412	<b>17.459</b>
	6	2437	<b>17.301</b>
	11	2462	<b>17.274</b>
802.11n20	1	2412	<b>18.128</b>
	6	2437	<b>18.138</b>
	11	2462	<b>18.094</b>

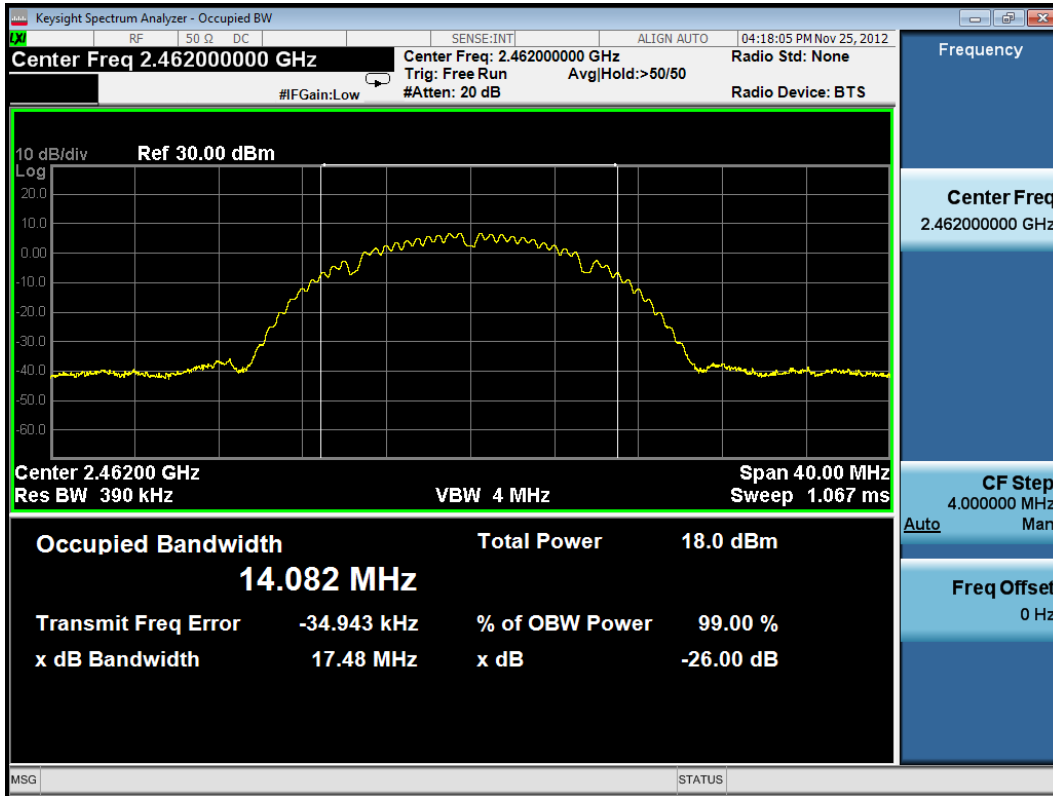
802.11b CH2412MHz



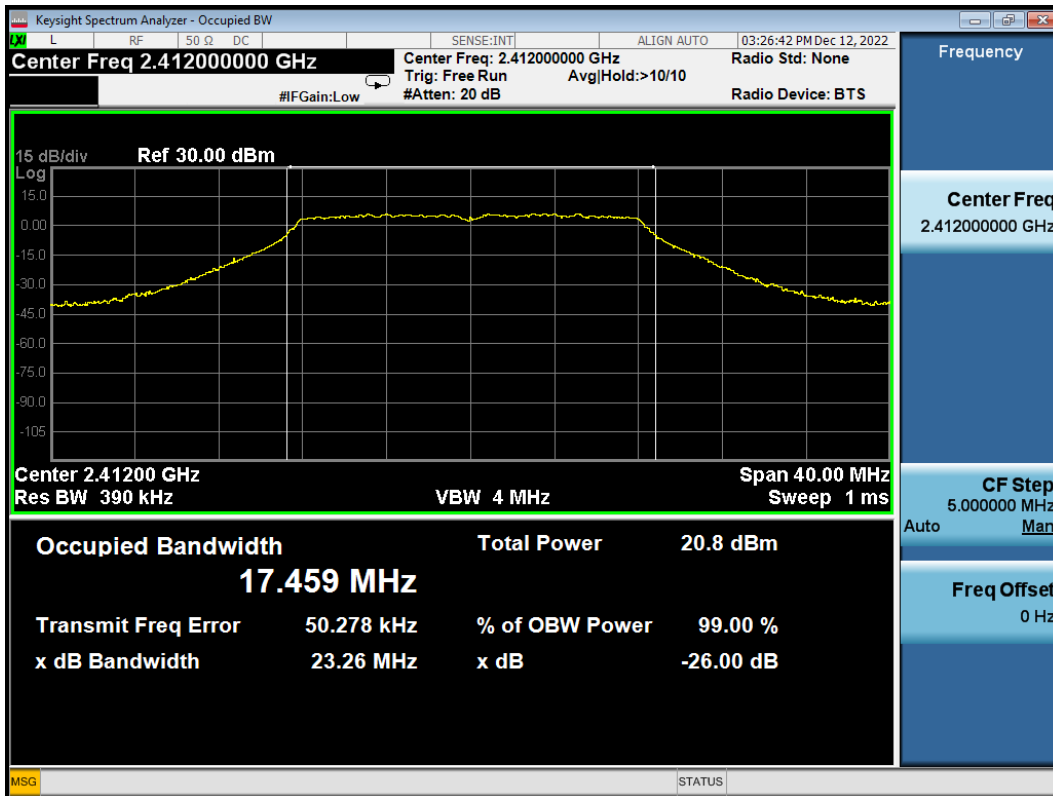
802.11b CH2437MHz



802.11b CH2462MHz

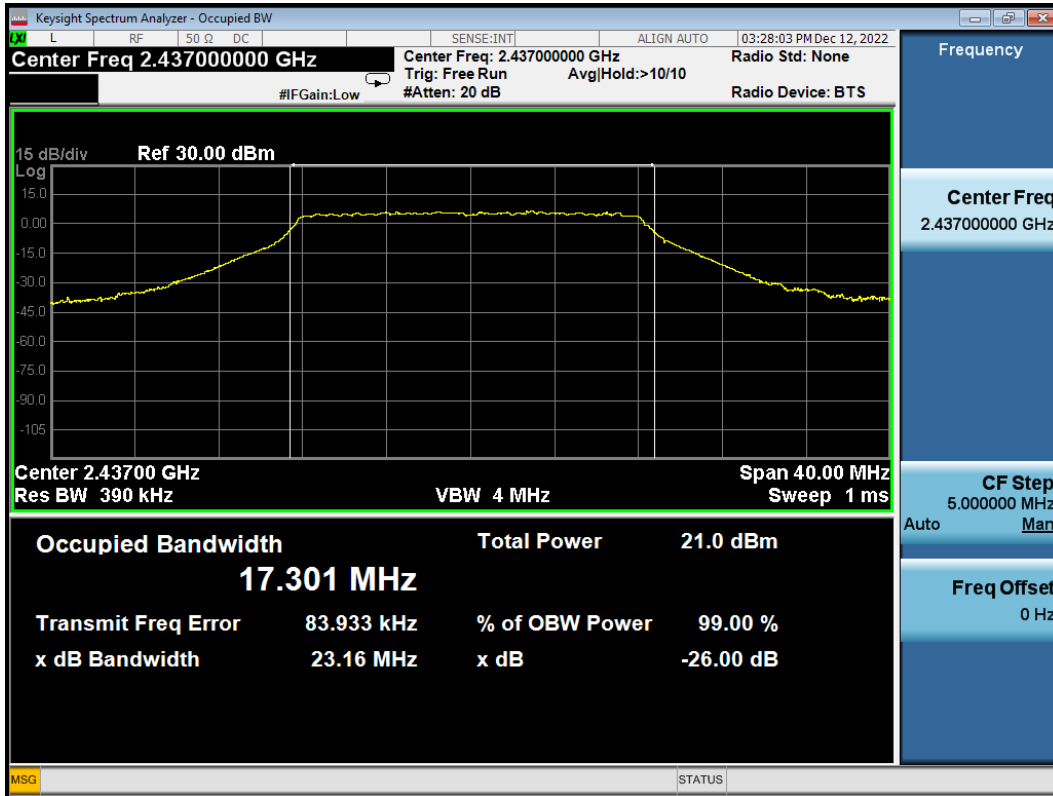


802.11g CH2412MHz

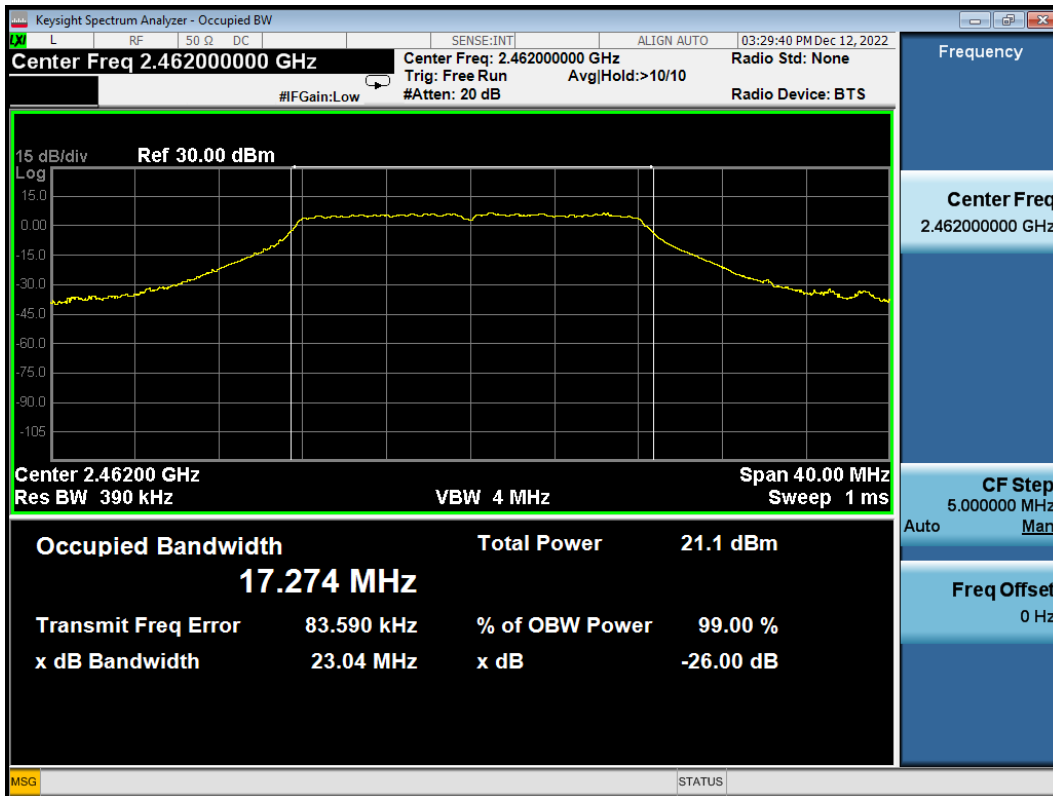




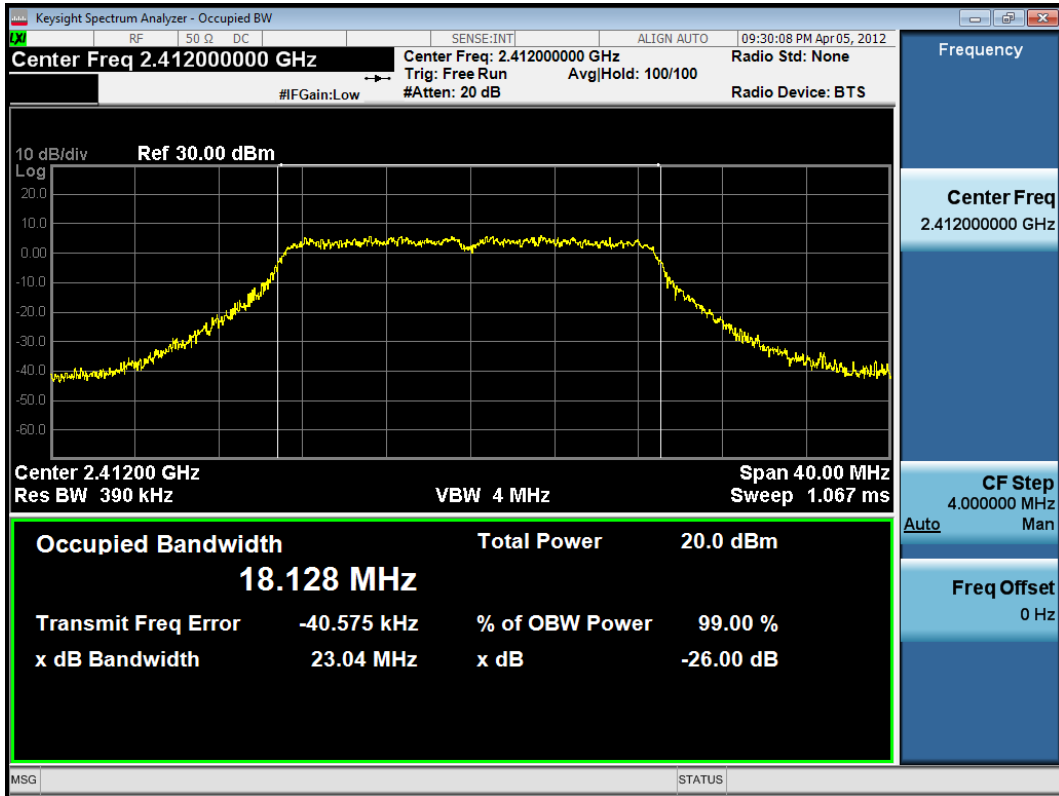
### 802.11g CH2437MHz



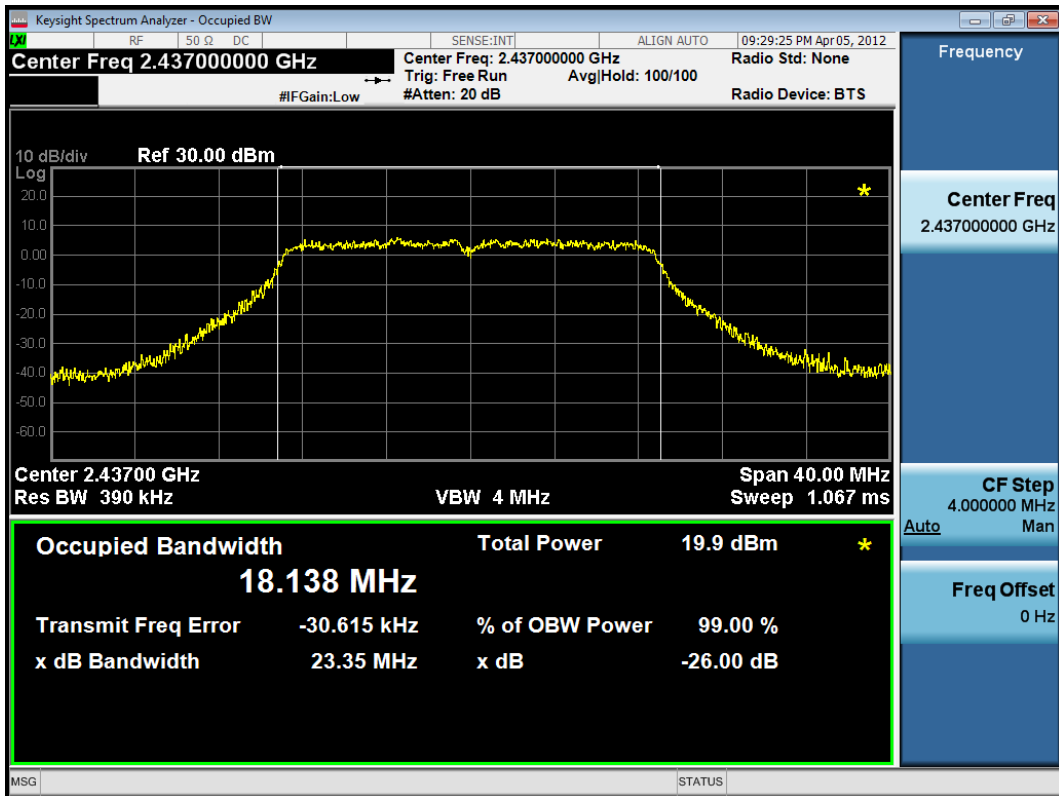
### 802.11g CH2462MHz



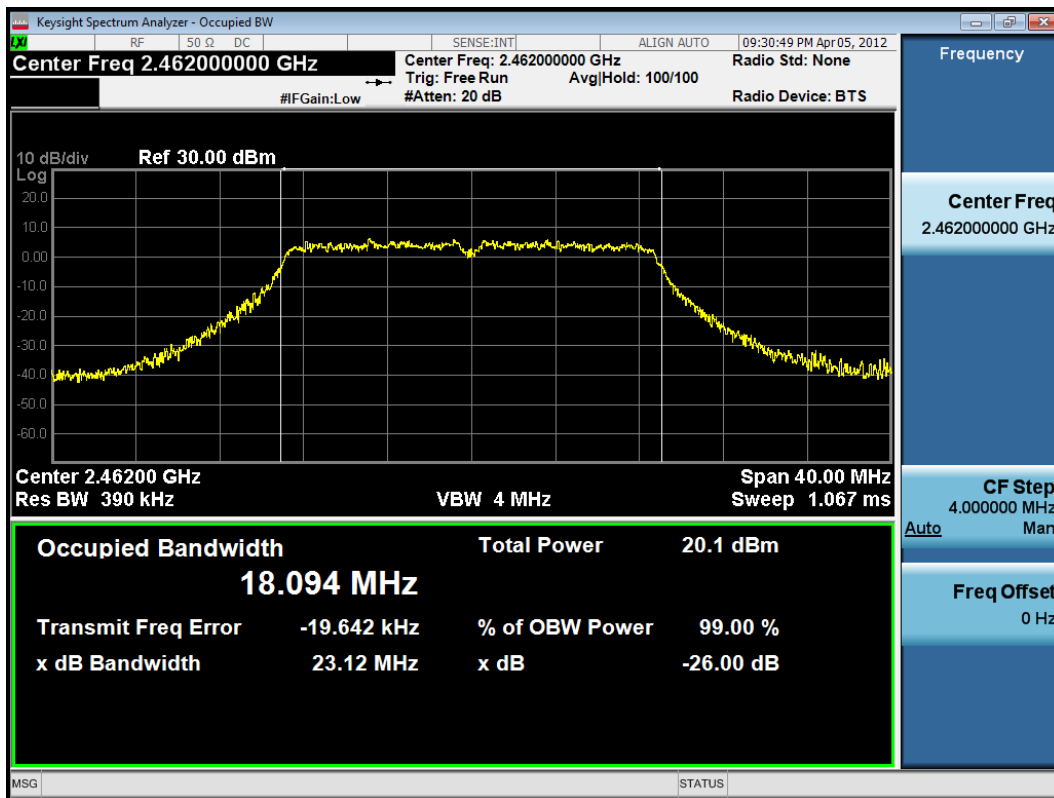
802.11n20 CH2412MHz



802.11n20 CH2437MHz



802.11n20 CH2462MHz



## 6 6 dB BANDWIDTH MEASUREMENT

### 6.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
4.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2022.09.15	1 Year
5.	Coaxial Cable	WOKEN	SFL402-105F LEX	F02-150819-045	2022.03.07	1 Year
6.	20 dB Attenuator	Mini-Circuits	VAT-20+	001	2022.08.06	1 Year

### 6.2 Block Diagram of Test Setup

The Same as Section. 5.2.

### 6.3 Specification Limits (§15.247(a)(2))

The minimum 6 dB bandwidth shall be at least 500 kHz.

### 6.4 Operating Condition of EUT

The software as section 2.3 was used to enable the EUT to change the test mode one by one.

### 6.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with settings: RBW = 100kHz, VBW  $\geq 3 \times$  RBW.

The 6 dB bandwidth is defined as the total spectrum the power of which is lower than peak power minus 6 dB .

The test procedure is defined in ANSI C63.10-2013 (the 11.8.2 Measurement Procedure “Option 2” was used).

## 6.6 Test Results

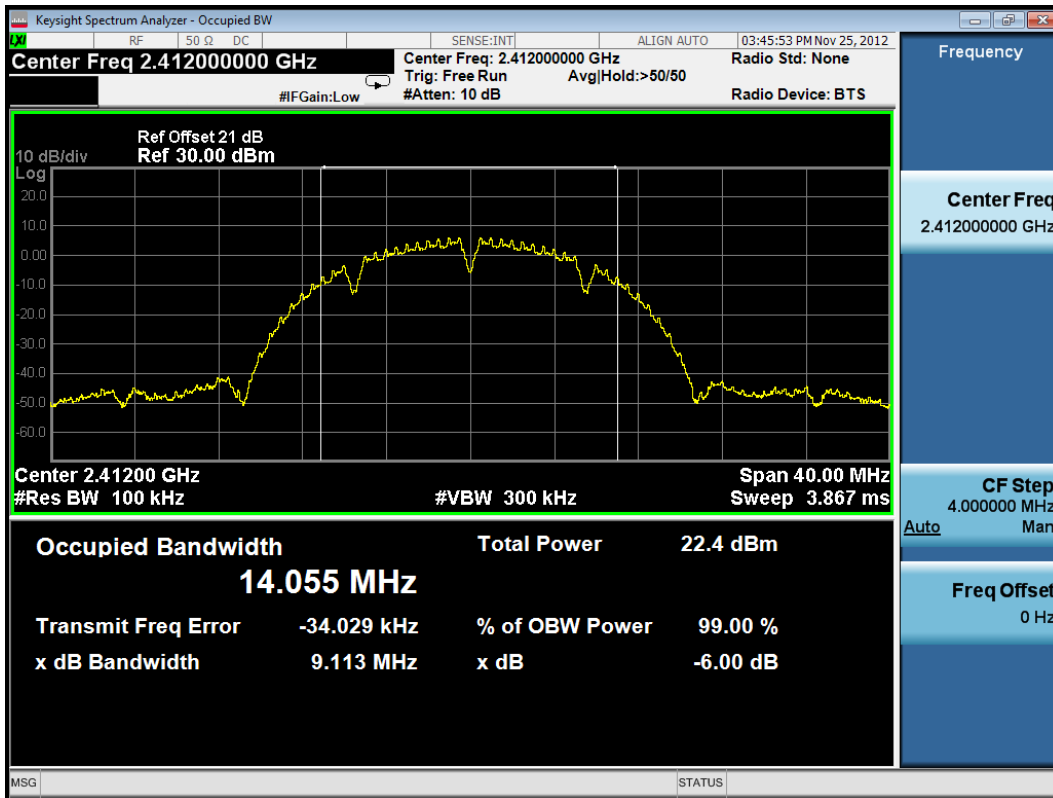
**PASSED.**

All the test results are attached in next pages.

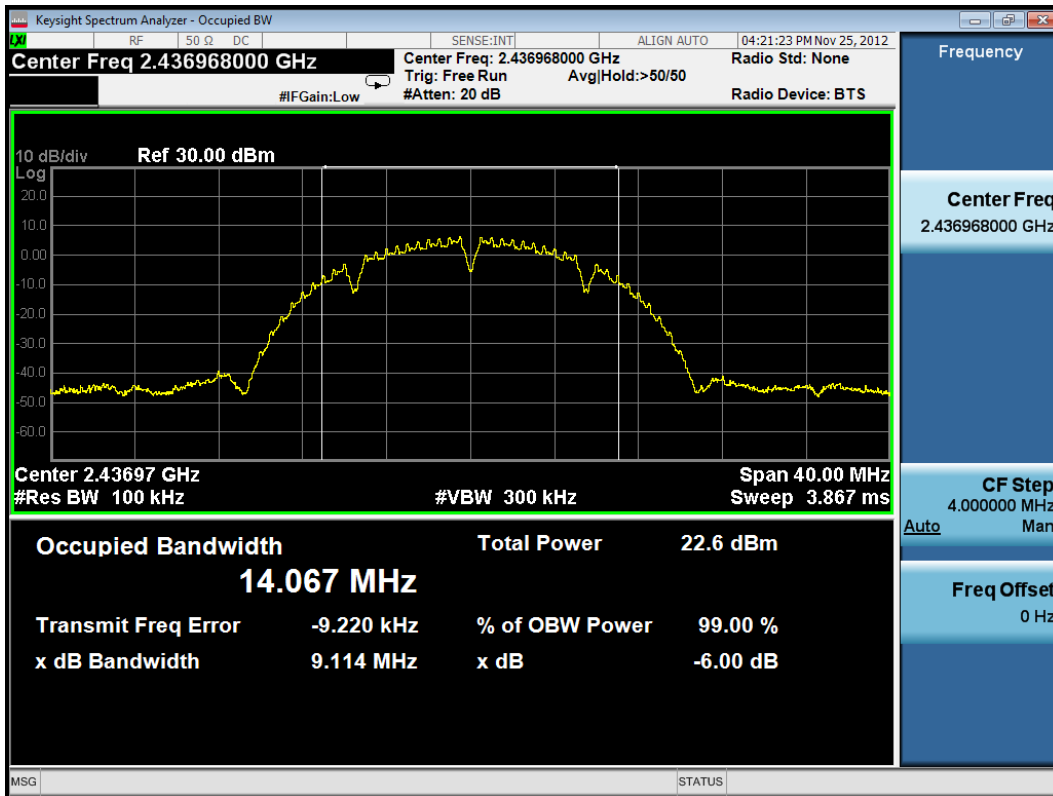
(Test Date: 2022.11.24-25 Temperature: 23°C Humidity: 51 %)

Modulation	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit
802.11b	1	2412	<b>9.113</b>	500 kHz
	6	2437	<b>9.114</b>	500 kHz
	11	2462	<b>9.112</b>	500 kHz
802.11g	1	2412	<b>16.38</b>	500 kHz
	6	2437	<b>16.36</b>	500 kHz
	11	2462	<b>16.35</b>	500 kHz
802.11n20	1	2412	<b>17.76</b>	500 kHz
	6	2437	<b>17.73</b>	500 kHz
	11	2462	<b>17.79</b>	500 kHz

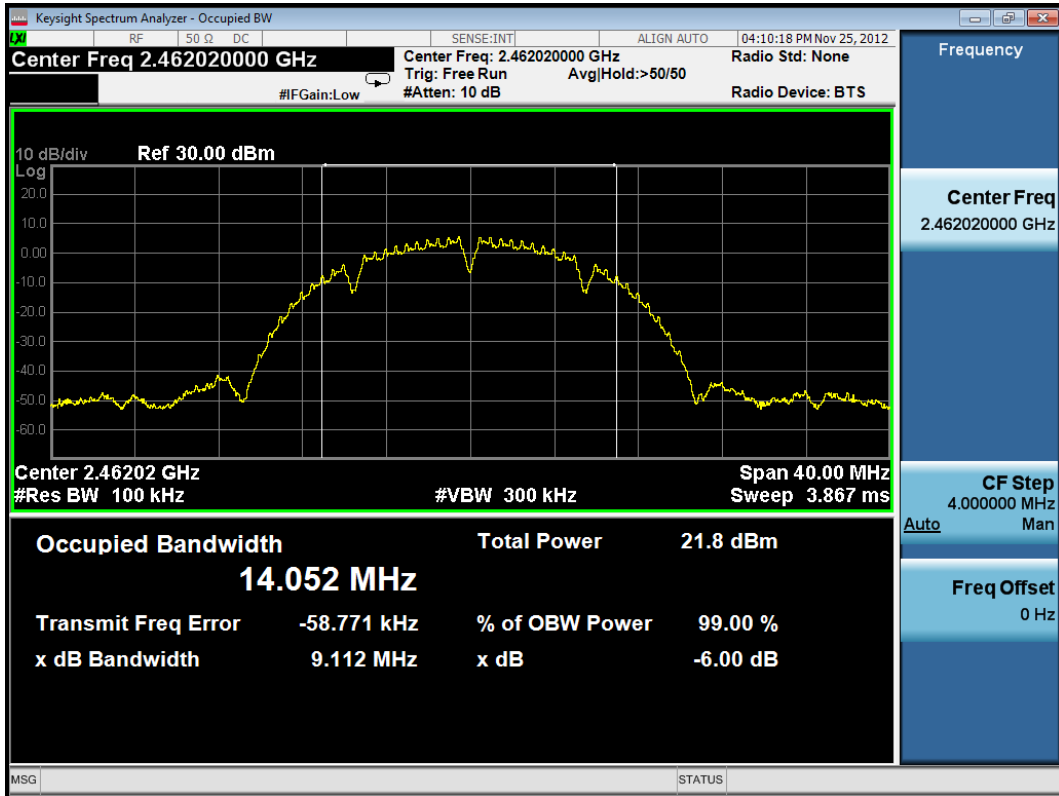
802.11b CH2412MHz



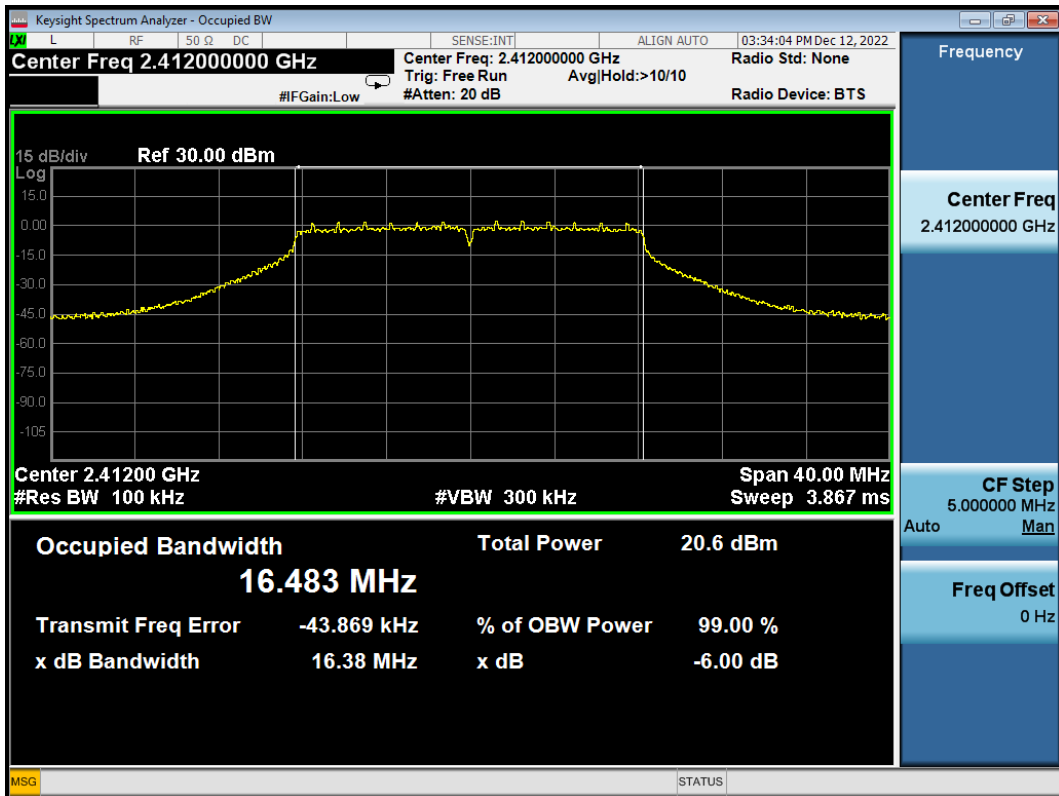
802.11b CH2442MHz



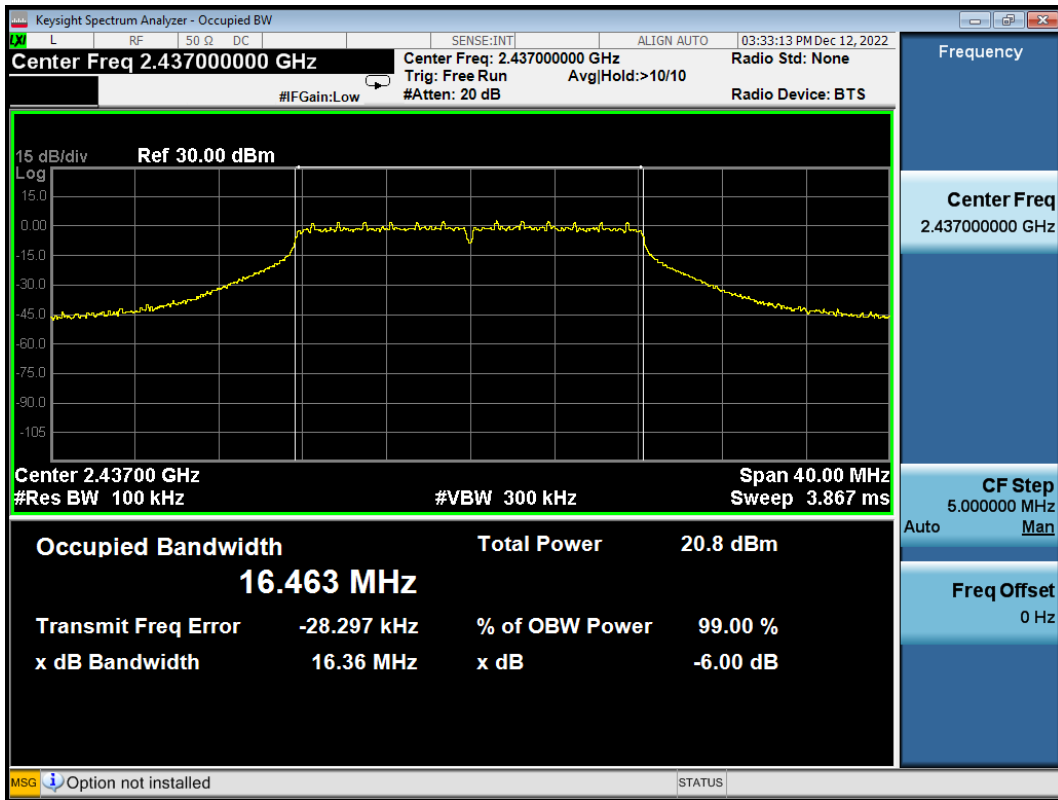
802.11b CH2472MHz



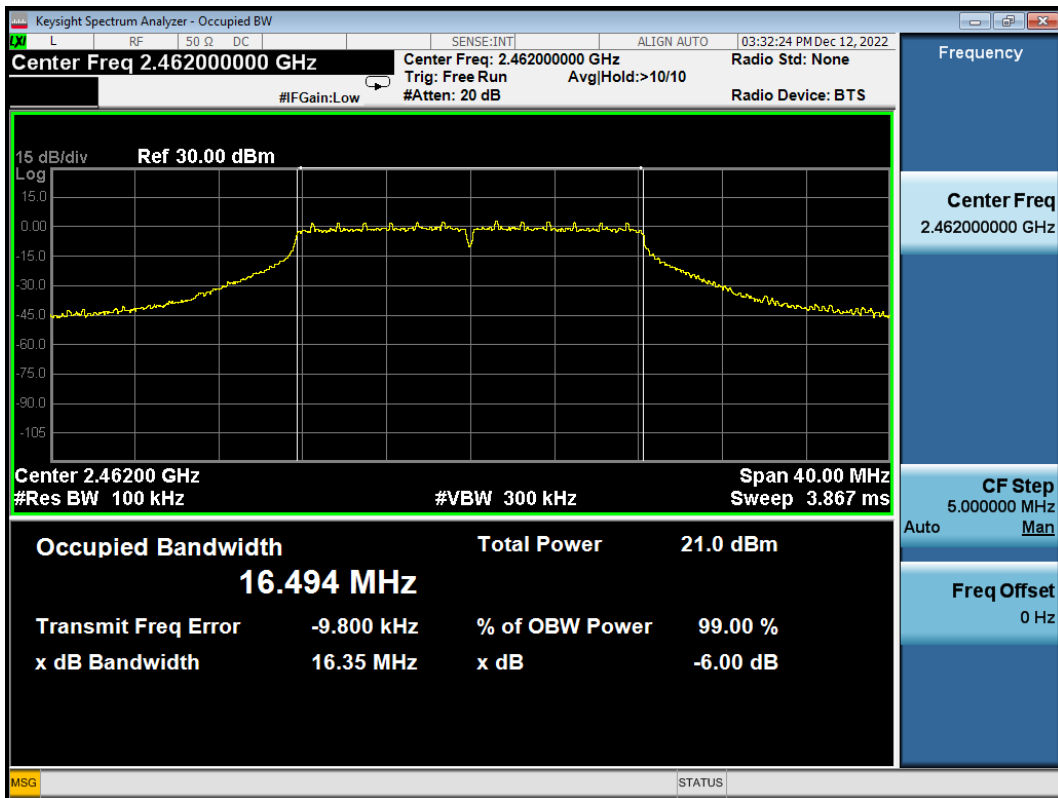
802.11g CH2412MHz



802.11g CH2437MHz

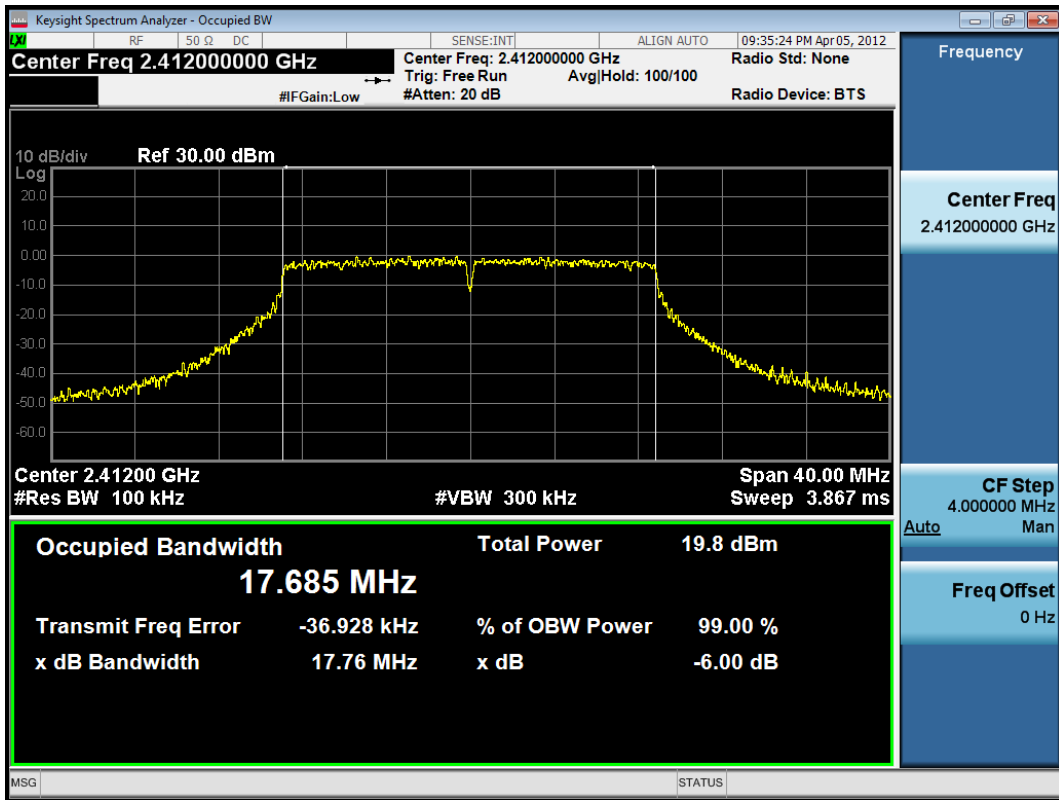


802.11g CH2462MHz

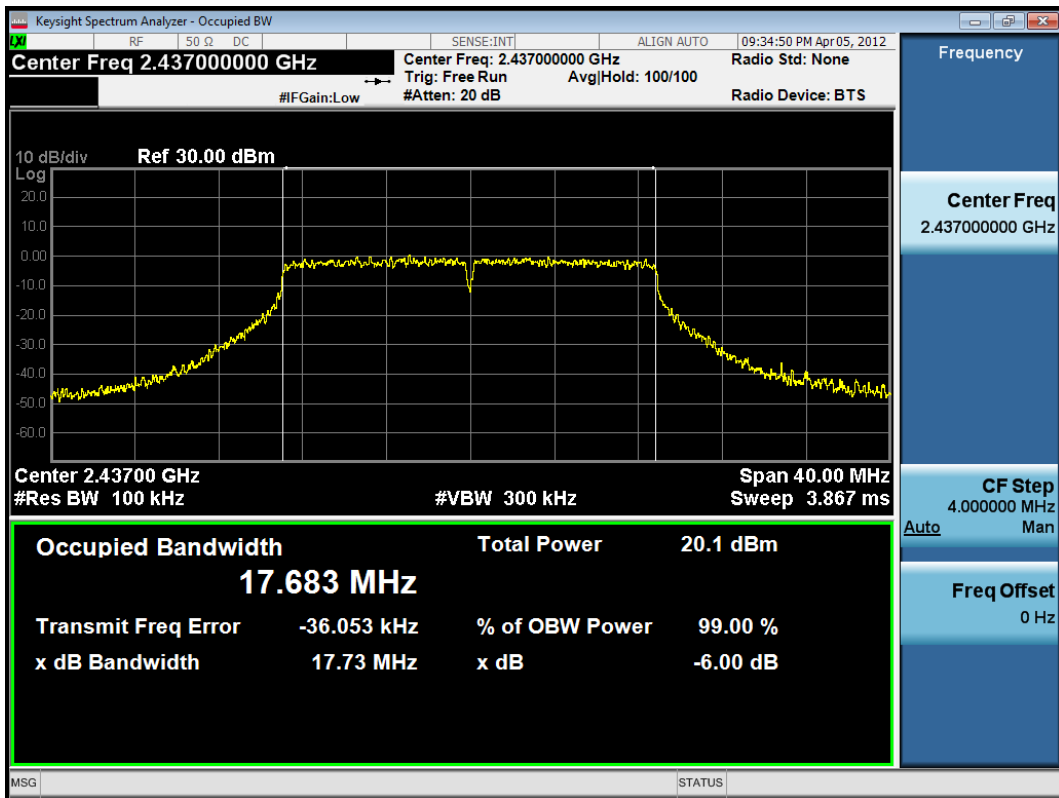




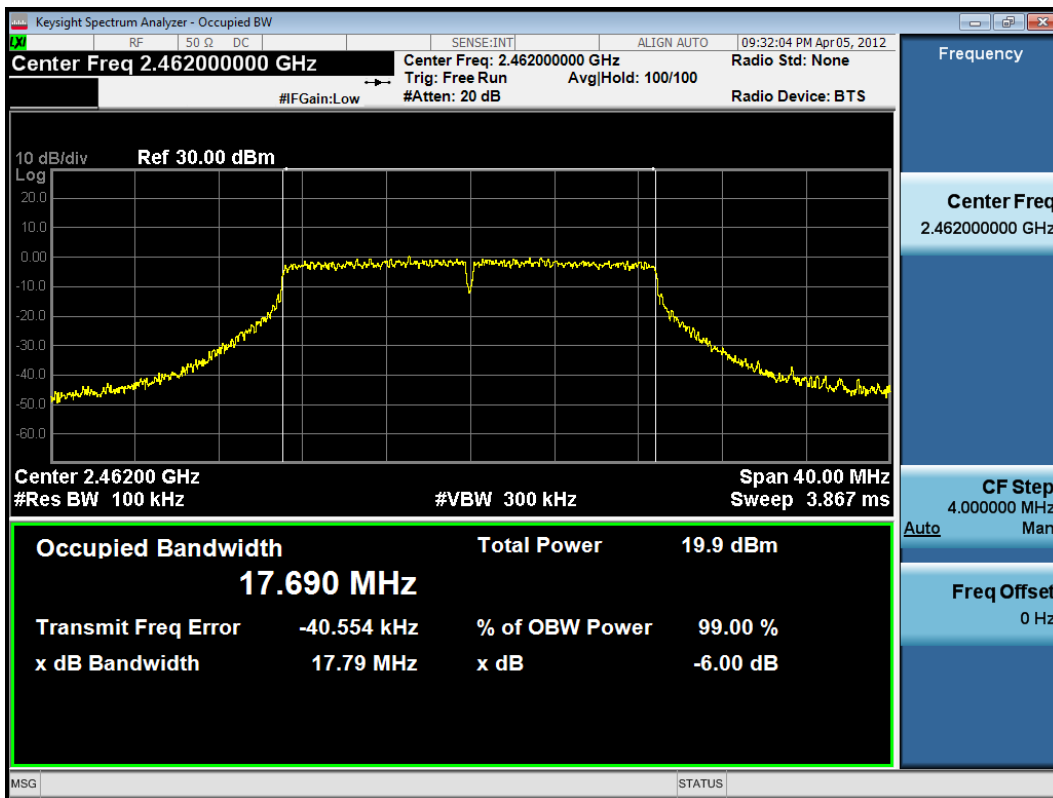
802.11n20 CH2412MHz



802.11n20 CH2437MHz



802.11n20 CH2462MHz



## 7 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

### 7.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2022.09.15	1 Year
2.	Coaxial Cable	WOKEN	SFL402-105F LEX	F02-150819-045	2022.03.07	1 Year
3.	20 dB Attenuator	Mini-Circuits	VAT-20+	001	2022.08.06	1 Year

### 7.2 Block Diagram of Test Setup

The Same as Section. 5.2.

### 7.3 Specification Limits ((§15.247(b)(3))

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5 MHz is: 1 Watt. (30 dBm)

### 7.4 Operating Condition of EUT

The software as section 2.3 was used to enable the EUT to change the test mode one by one.

### 7.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

Method AVGPSD-2 uses trace averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction.

The procedure for this method is as follows:

- a) Measure the duty cycle (D) of the transmitter output signal as described in 11.6.
- b) Set span to at least 1.5 times the OBW.
- c) Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
- d) Set VBW  $\geq [3 \times \text{RBW}]$ .
- e) Number of points in sweep  $\geq [2 \times \text{span} / \text{RBW}]$ . (This gives bin-to-bin spacing  $\leq \text{RBW} / 2$ , so that narrowband signals are not lost between frequency bins.)
- f) Sweep time = auto.
- g) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- h) Do not use sweep triggering. Allow the sweep to “free run.”
- i) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
- j) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power

function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

k) Add  $[10 \log (1 / D)]$ , where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add  $[10 \log (1/0.25)] = 6 \text{ dB}$  if the duty cycle is 25%.

The test procedure is defined in ANSI C63.10-2013 ( 11.9.2.2.4 Measurement Procedure “ Method AVGSA-2 ” was used).

## 7.6 Test Results

**PASSED.**

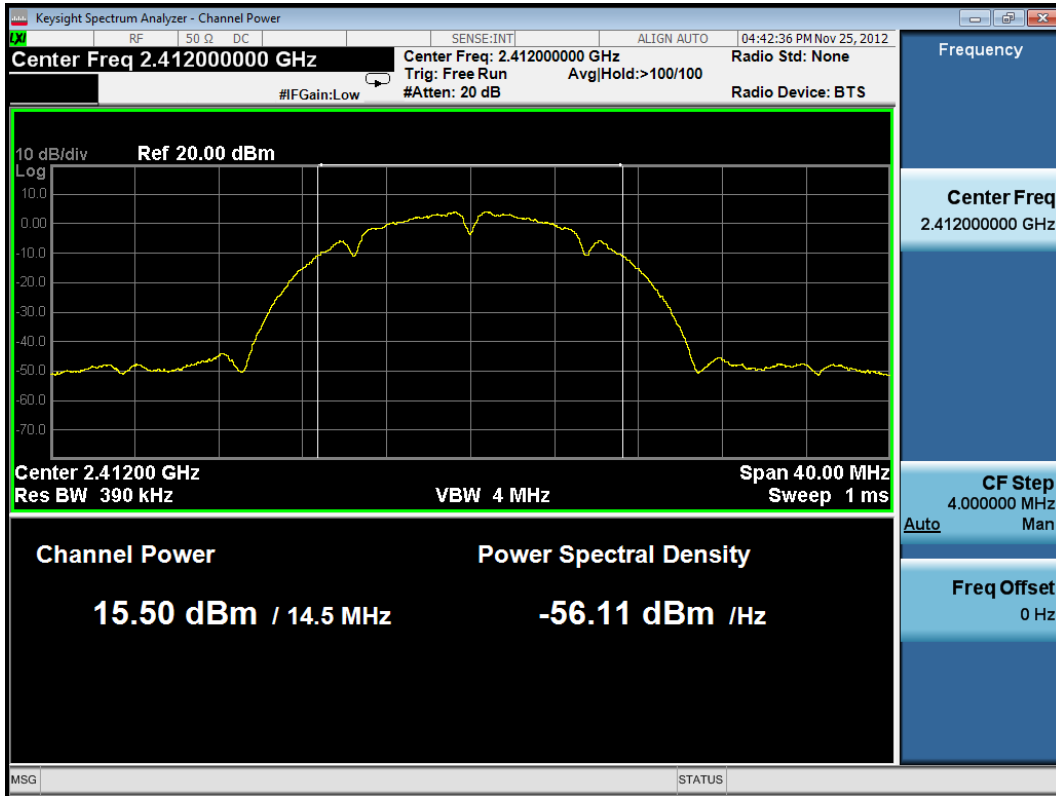
All the test results are listed below.

(Test Date: 2022.11.24-25 Temperature: 23°C Humidity: 51 %)

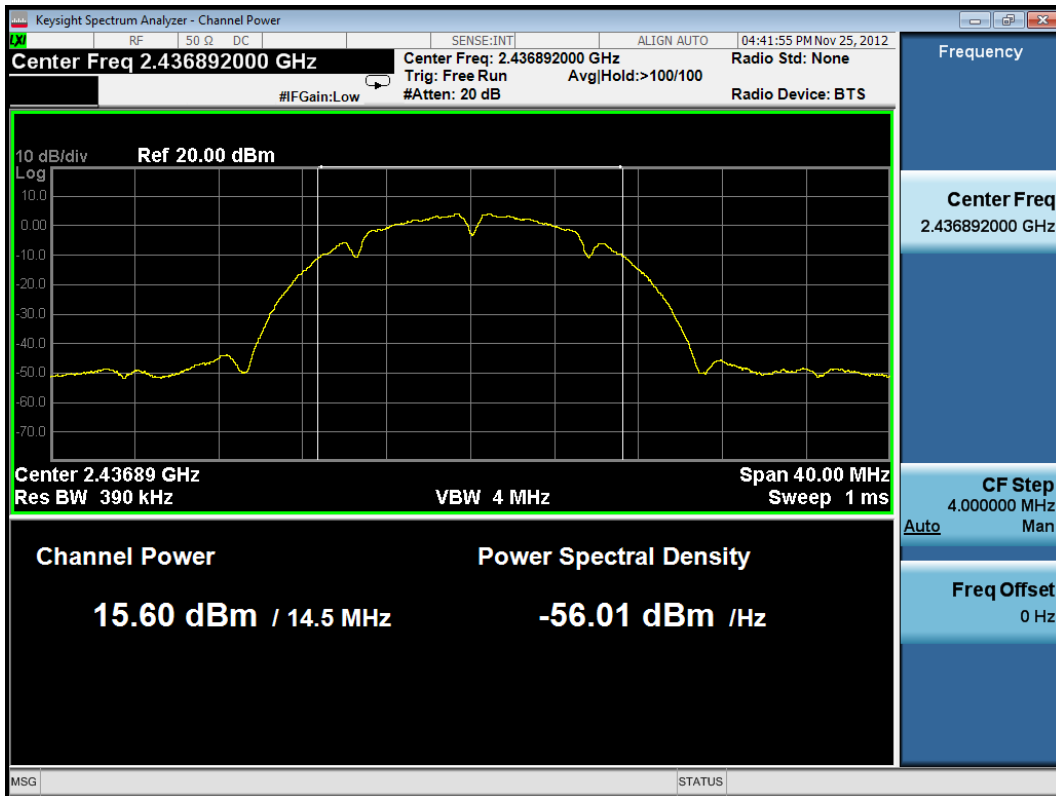
Modulation	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)	Correct Factor (dB)
802.11b	18.29	18.34	99.73	0.01
802.11g	2.065	2.195	94.08	0.27
802.11n20	1.92	2.05	93.66	0.28

Modulation	Channel	Frequency (MHz)	Average conducted (average) Output Power (dBm)	Maximum conducted (average) Output Power (dBm)	Limit
802.11b	1	2412	<b>15.5</b>	<b>15.51</b>	30 dBm
	6	2437	<b>15.6</b>	<b>15.61</b>	30 dBm
	11	2462	<b>14.85</b>	<b>14.86</b>	30 dBm
802.11g	1	2412	<b>13.05</b>	<b>13.32</b>	30 dBm
	6	2437	<b>13.08</b>	<b>13.35</b>	30 dBm
	11	2462	<b>13.25</b>	<b>13.52</b>	30 dBm
802.11n20	1	2412	<b>13.12</b>	<b>13.4</b>	30 dBm
	6	2437	<b>13.33</b>	<b>13.61</b>	30 dBm
	11	2462	<b>13.47</b>	<b>13.75</b>	30 dBm

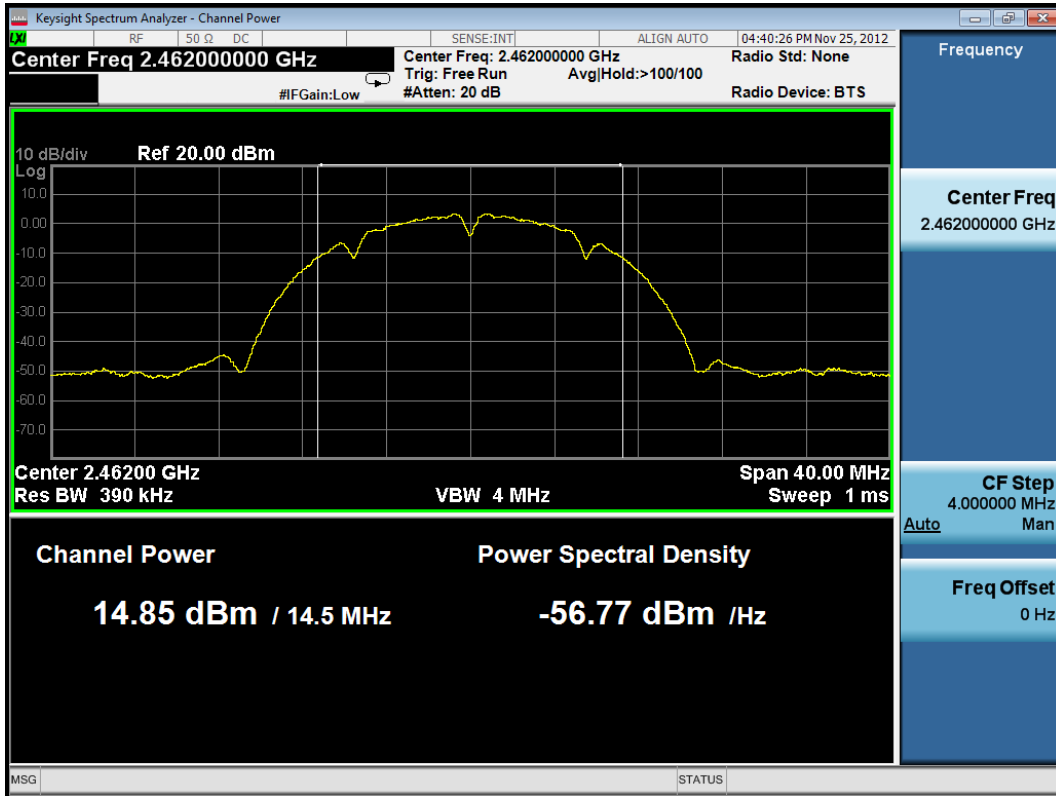
### 802.11b CH2412MHz



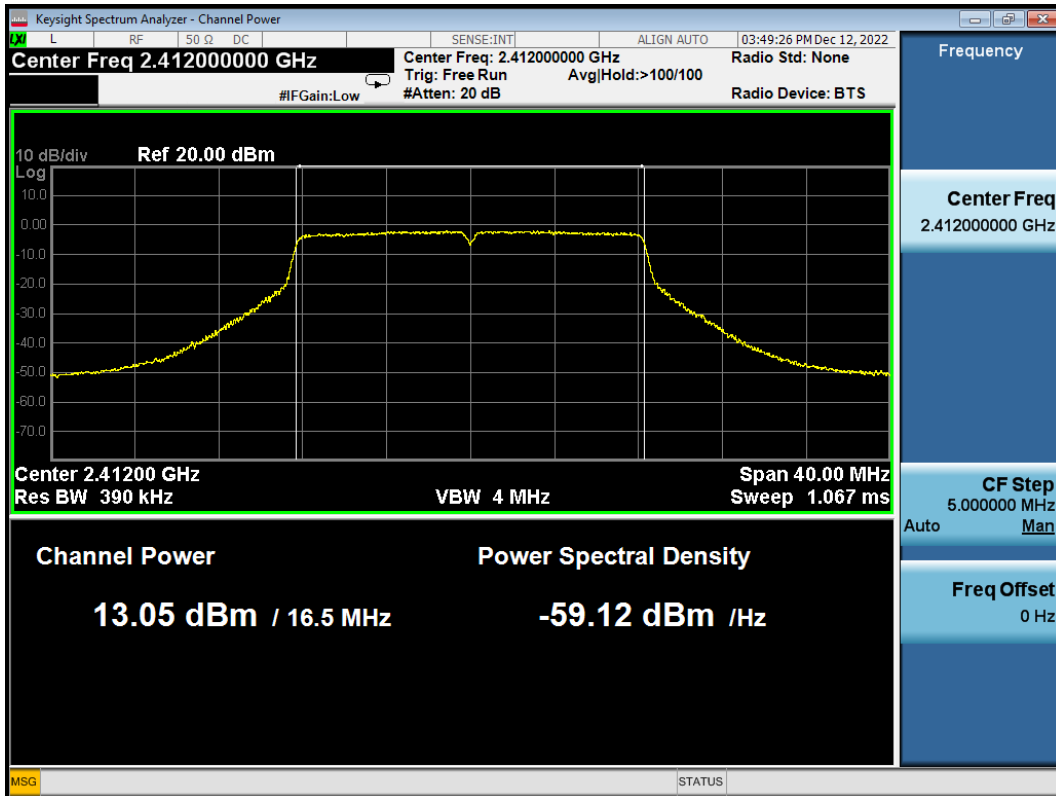
### 802.11b CH2442MHz



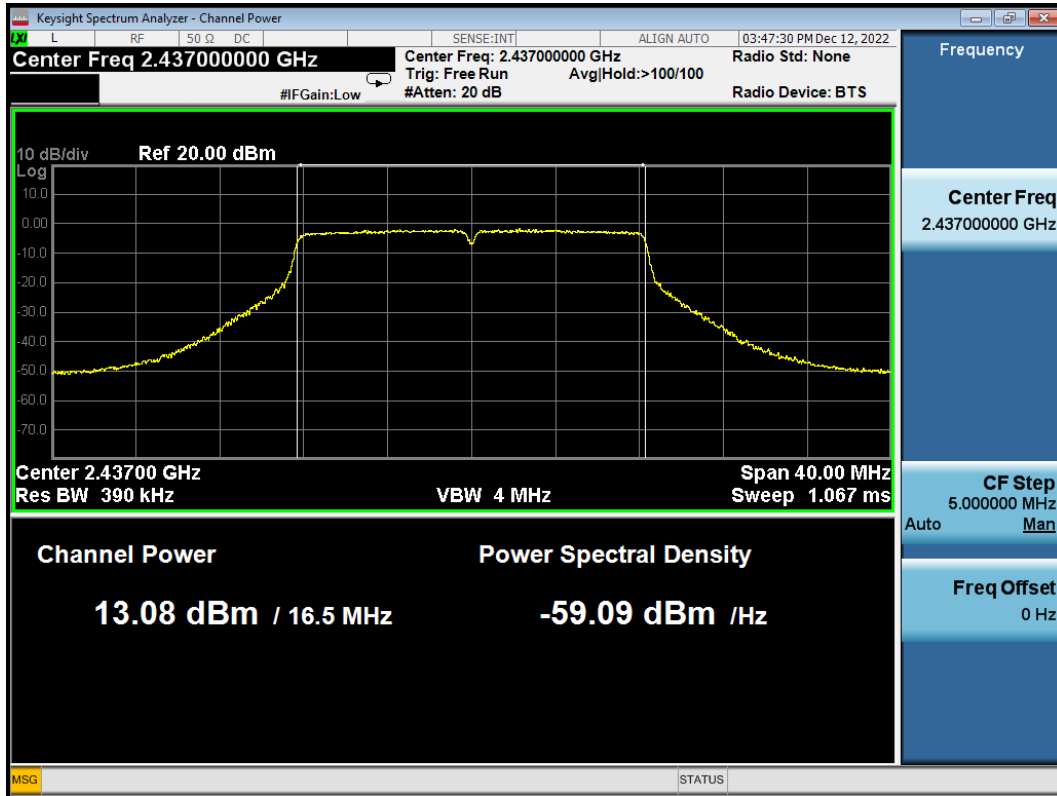
### 802.11b CH2462MHz



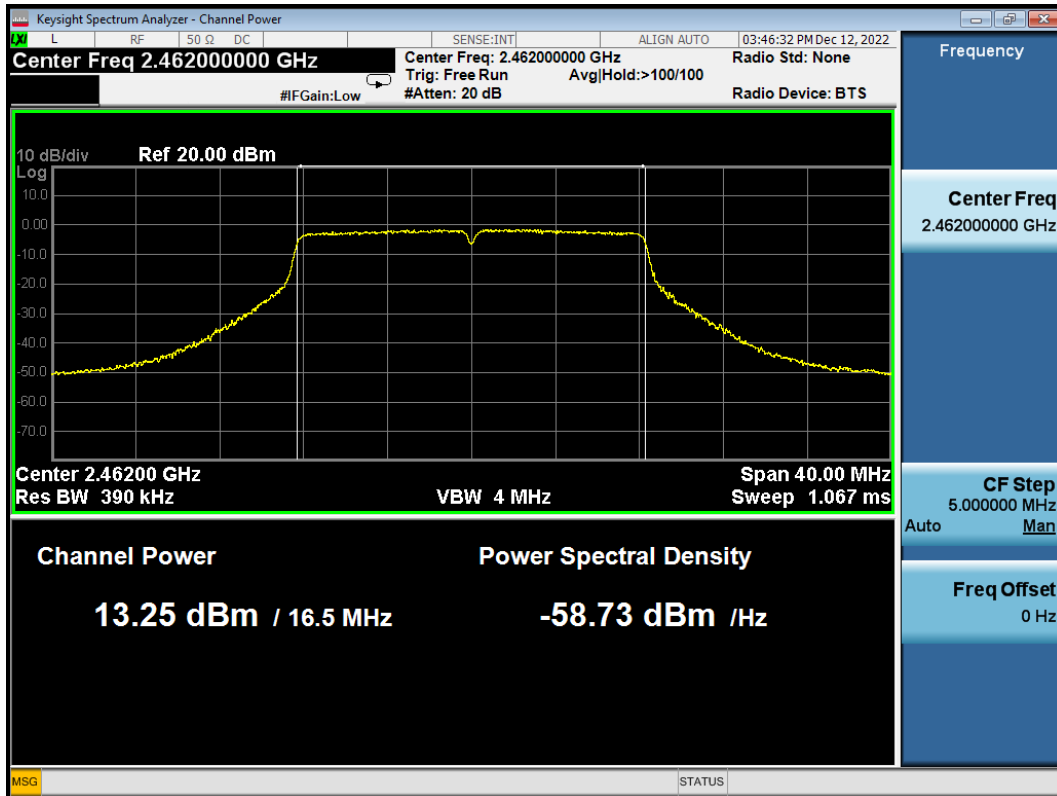
### 802.11g CH2412MHz



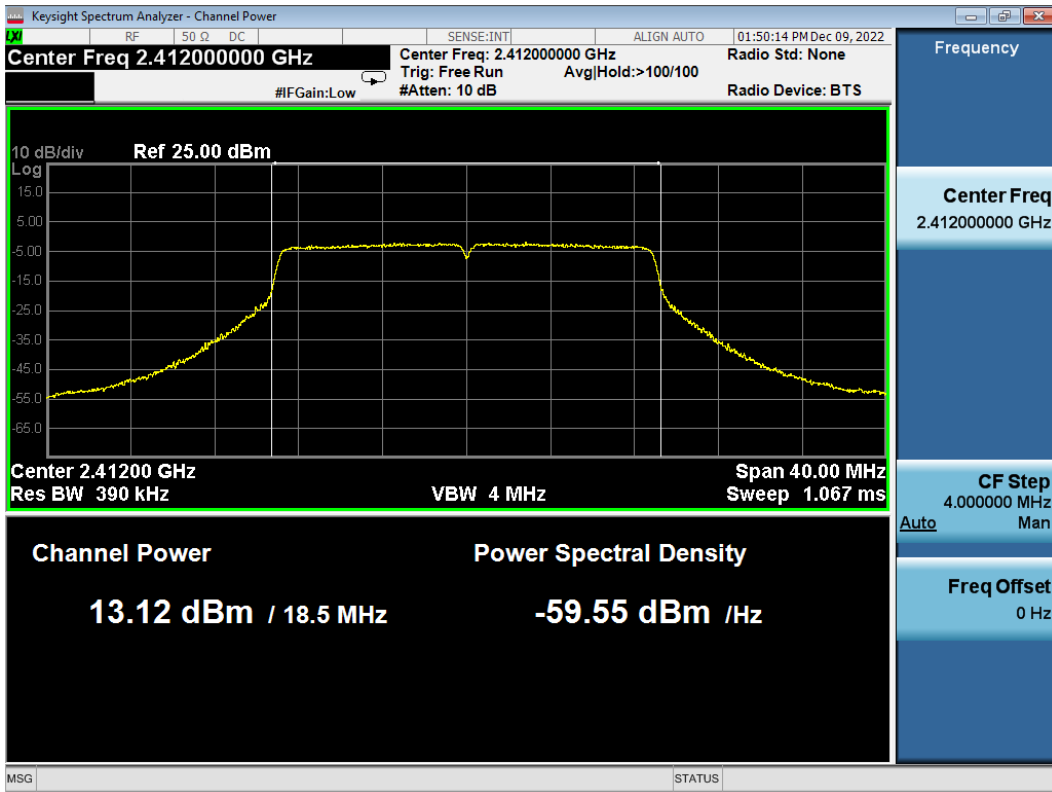
### 802.11g CH2437MHz



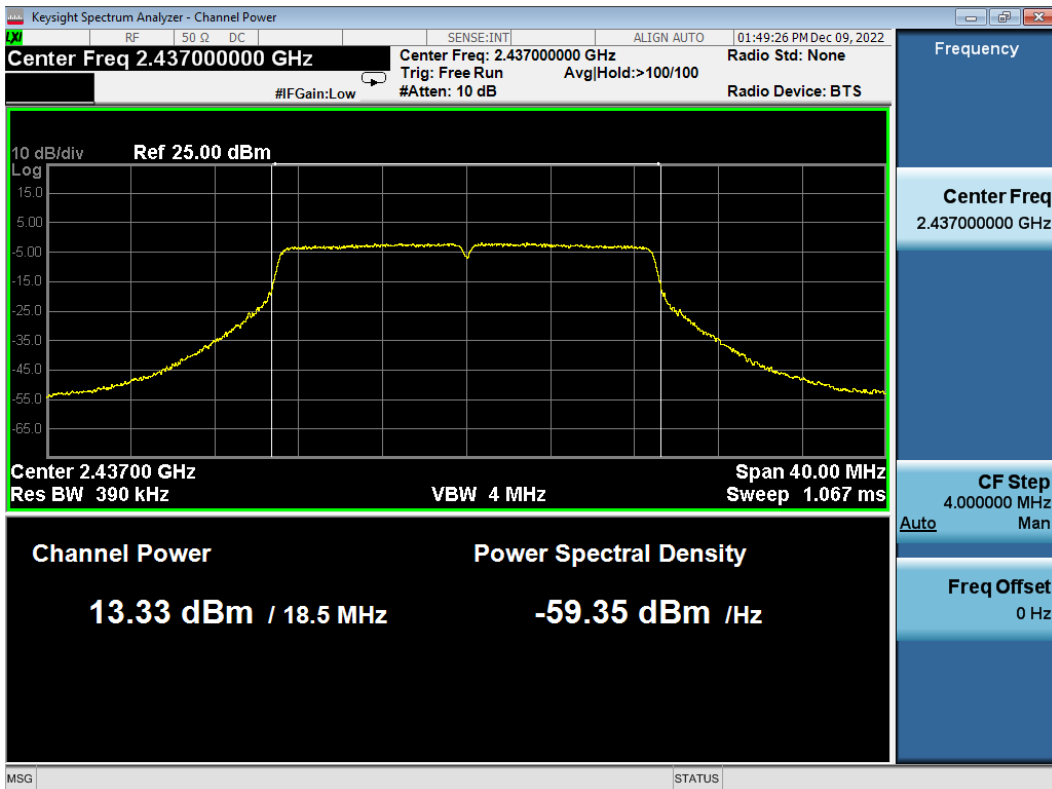
### 802.11g CH2462MHz



### 802.11n20 CH2412MHz

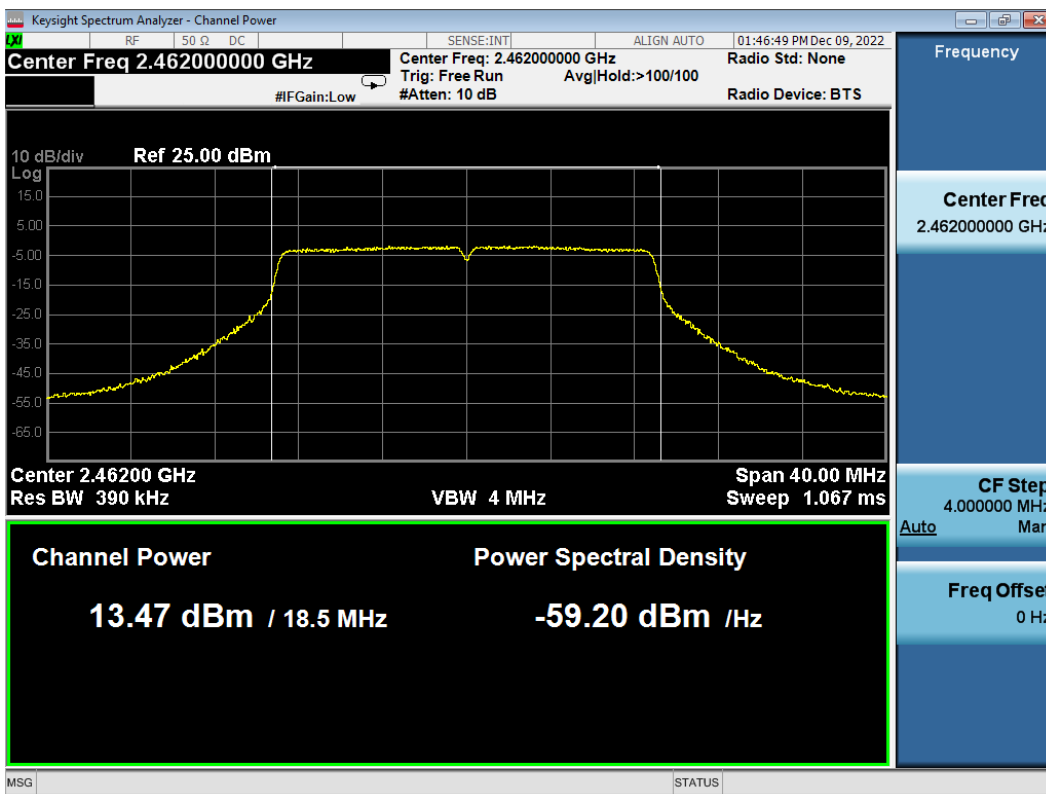


### 802.11n20 CH2437MHz





### 802.11n20 CH2462MHz



## 8 EMISSION LIMITATIONS MEASUREMENT

### 8.1 Test Equipment

The following test equipment was used during the emission limitations test:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2022.09.15	1 Year
2.	Coaxial Cable	WOKEN	SFL402-105F LEX	F02-150819-045	2022.03.07	1 Year
3.	20 dB Attenuator	Mini-Circuits	VAT-20+	001	2022.08.06	1 Year

### 8.2 Block Diagram of Test Setup

The Same as Section. 5.2.

### 8.3 Specification Limits (§15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). (※This test result attaching to Section. 3.7)

### 8.4 Operating Condition of EUT

The software as section 2.3 was used to enable the EUT to change the test mode one by one.

### 8.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

Establish a reference level by using the following procedure:

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set the span to  $\geq 1.5$  times the DTS bandwidth.
- c) Set the RBW = 100 kHz.
- d) Set the VBW  $\geq [3 \times \text{RBW}]$ .
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Establish an emission level by using the following procedure:

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100 kHz.
- c) Set the VBW  $\geq [3 \times \text{RBW}]$ .
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

Scan up through 10<sup>th</sup> harmonic.

The test procedure is defined in ANSI C63.10-2013 (11.11.2 Reference level measurement and 11.11.3 Emission level measurement was used).

## 8.6 Test Results

### **PASSED.**

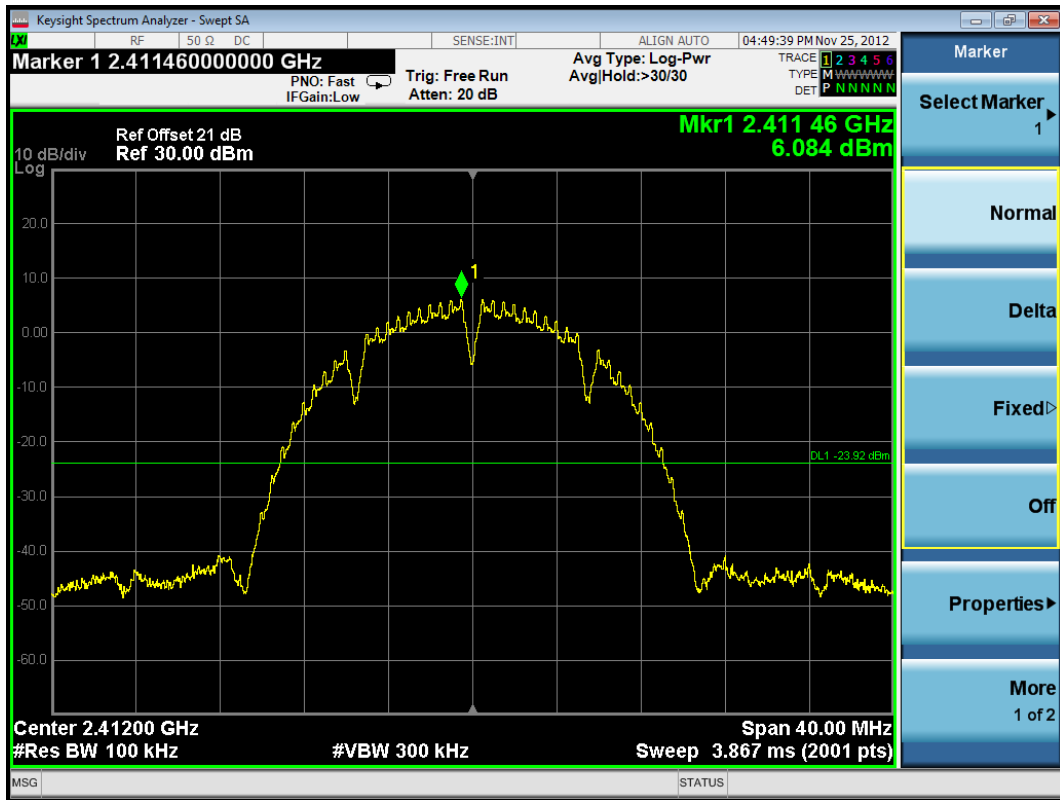
The test data was attached in the next pages.

(Test Date: 2022.11.24-25 Temperature: 23°C Humidity: 51 %)

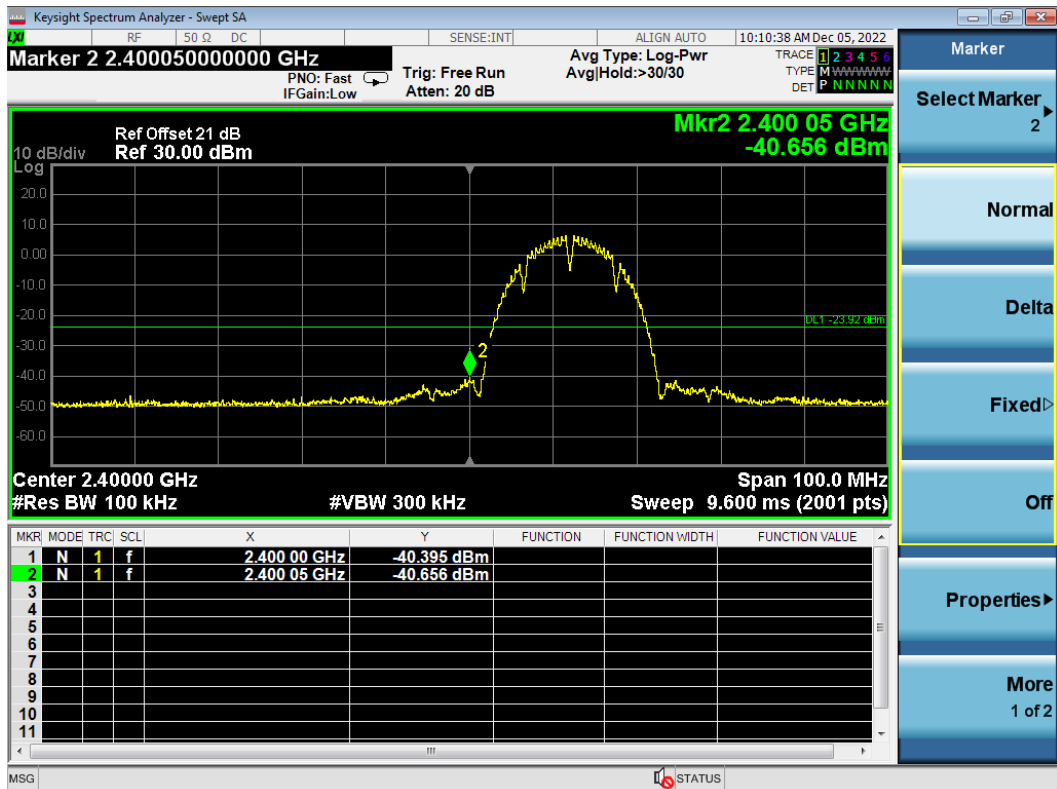
Modulation	Channel	Frequency (MHz)	Data Page
802.11b	1	2412	P53-54
	6	2437	P55-56
	11	2462	P57-58
802.11g	1	2412	P59-60
	6	2437	P61-62
	11	2462	P63-64
802.11n20	1	2412	P65-66
	6	2437	P67-68
	11	2462	P69-70

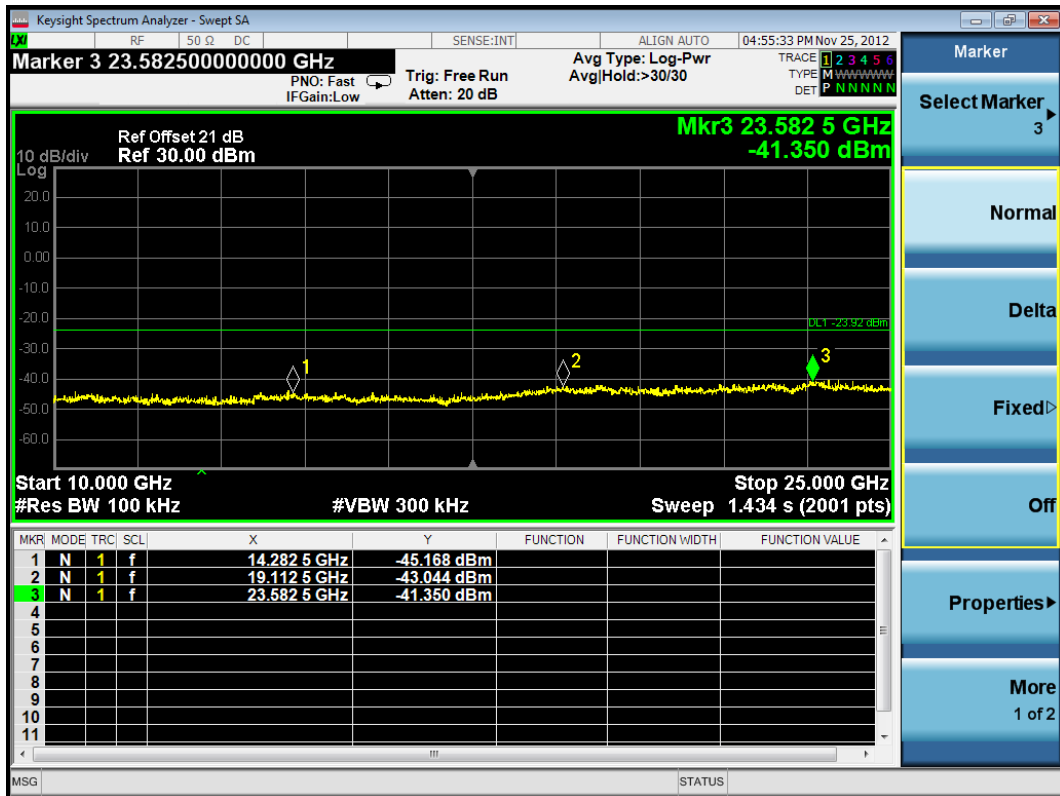
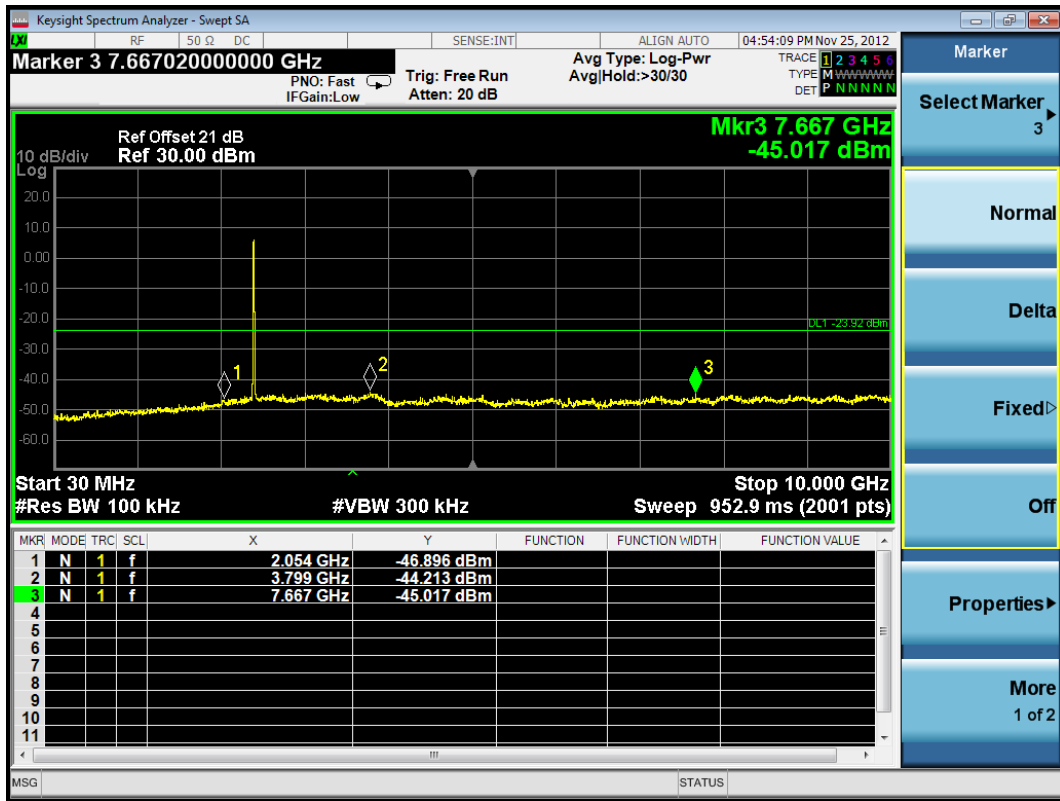
802.11b CH2412MHz

Reference level



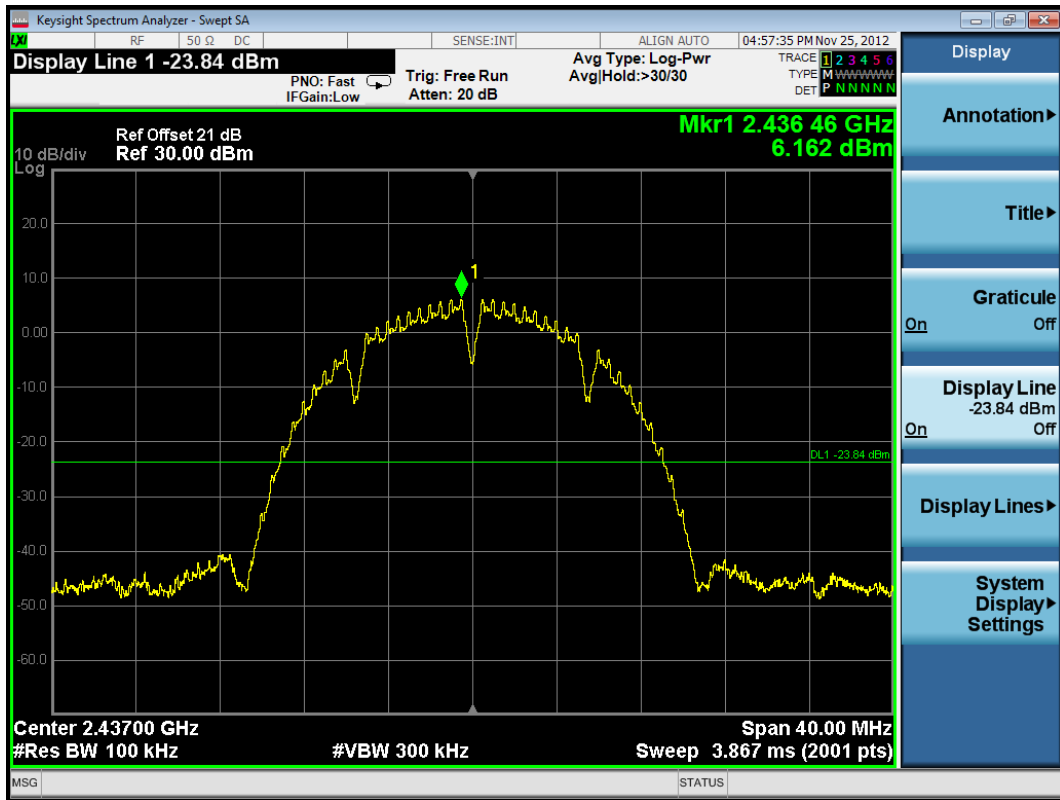
Emission level



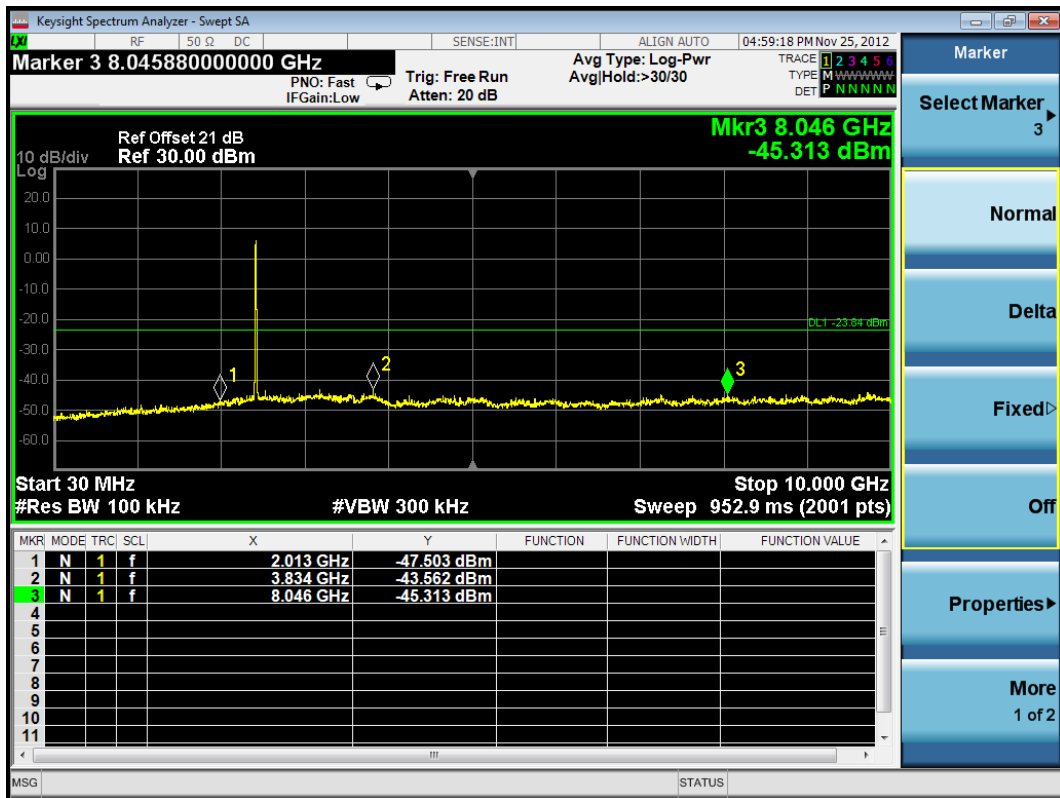


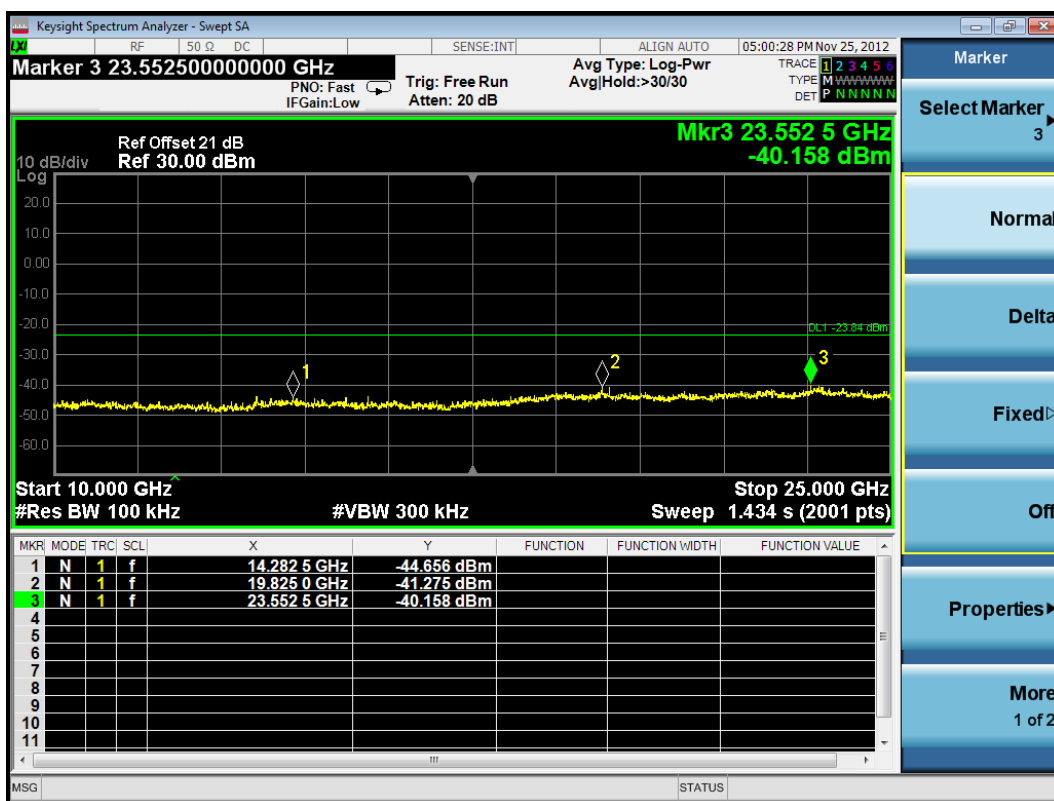
802.11b CH2437MHz

Reference level



Emission level

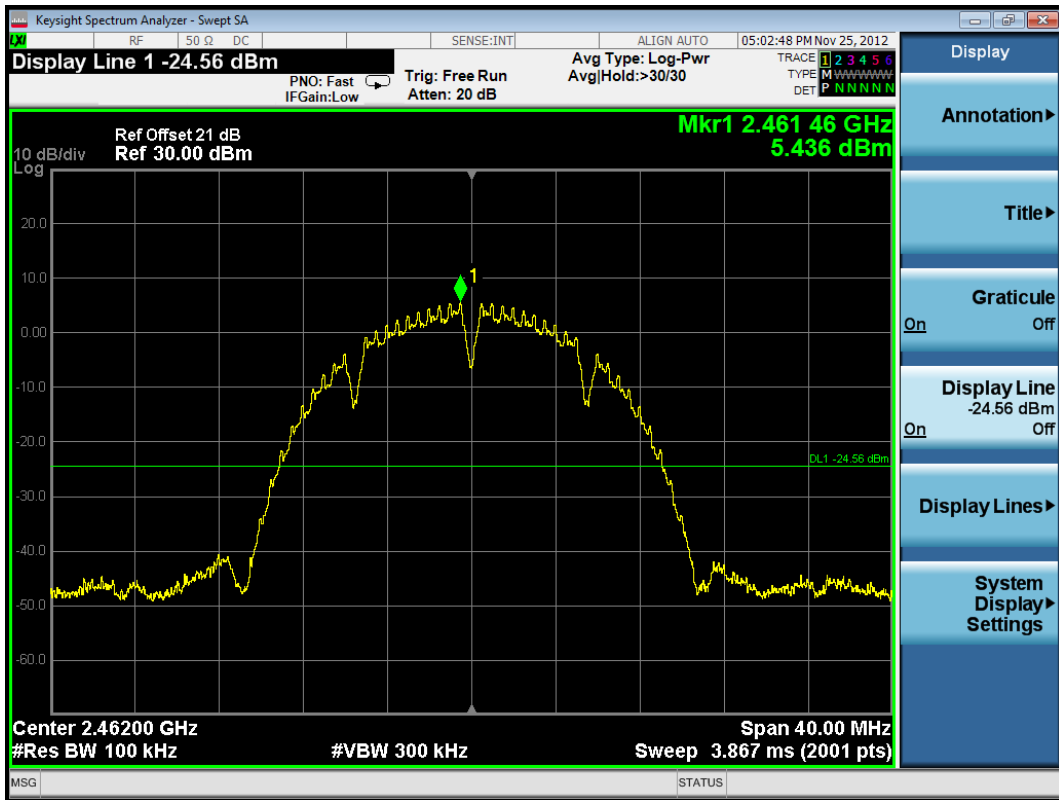




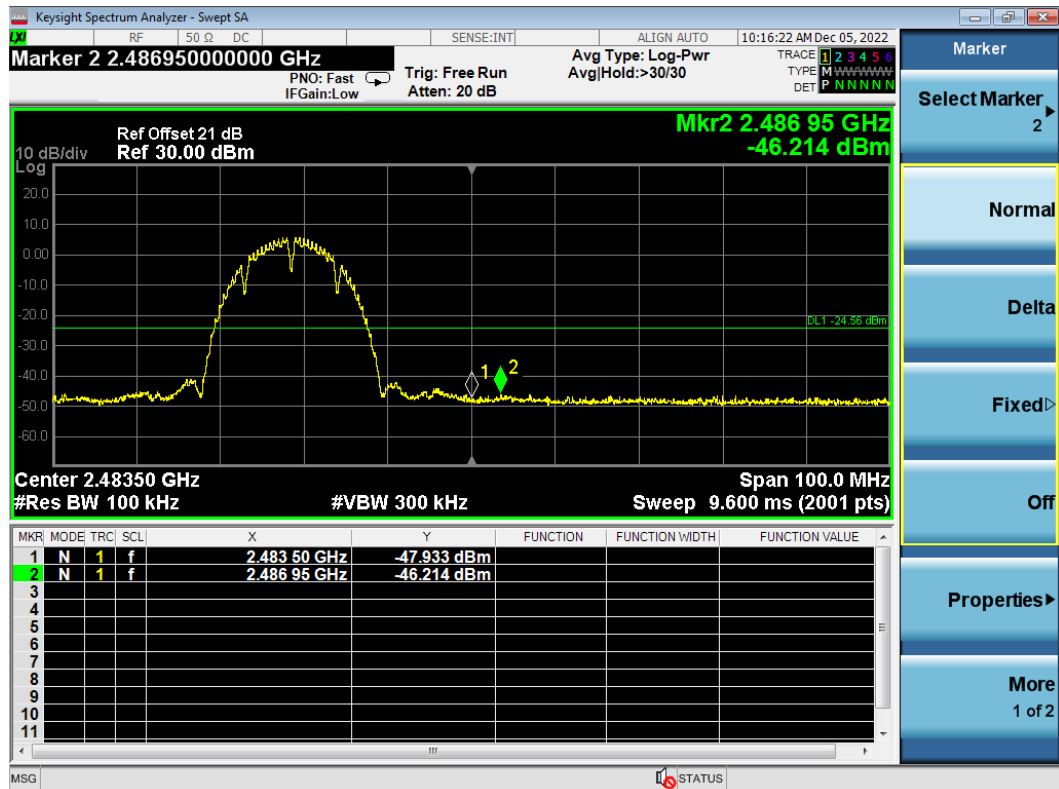


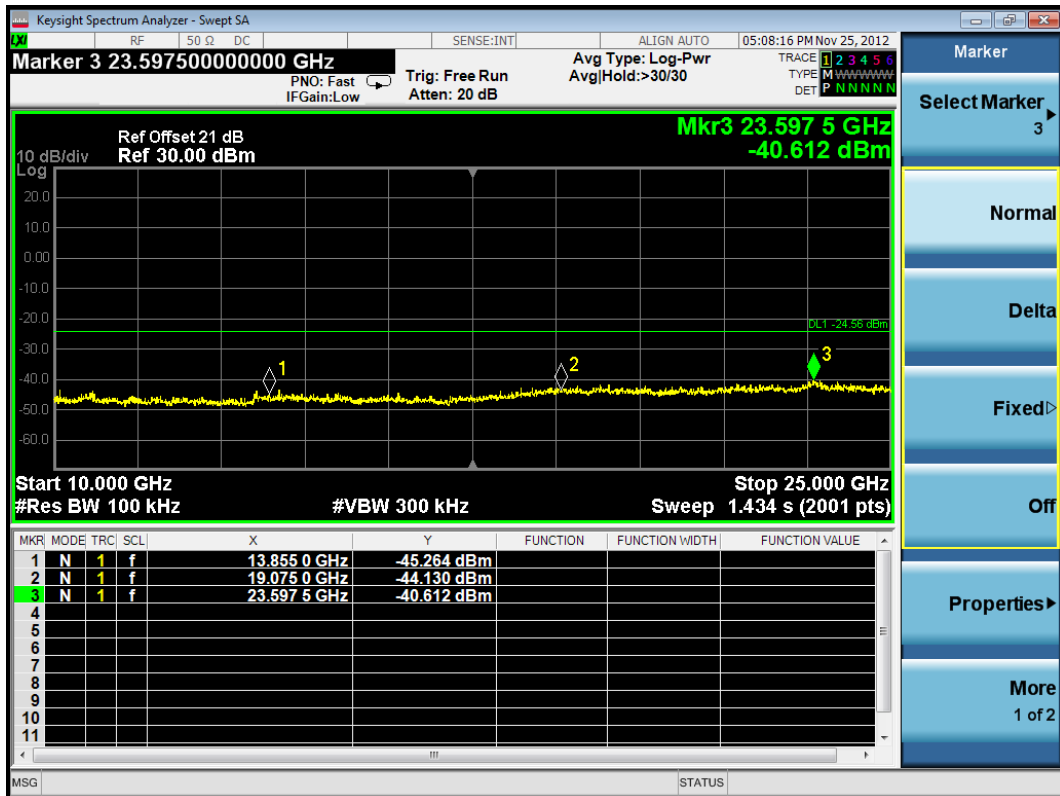
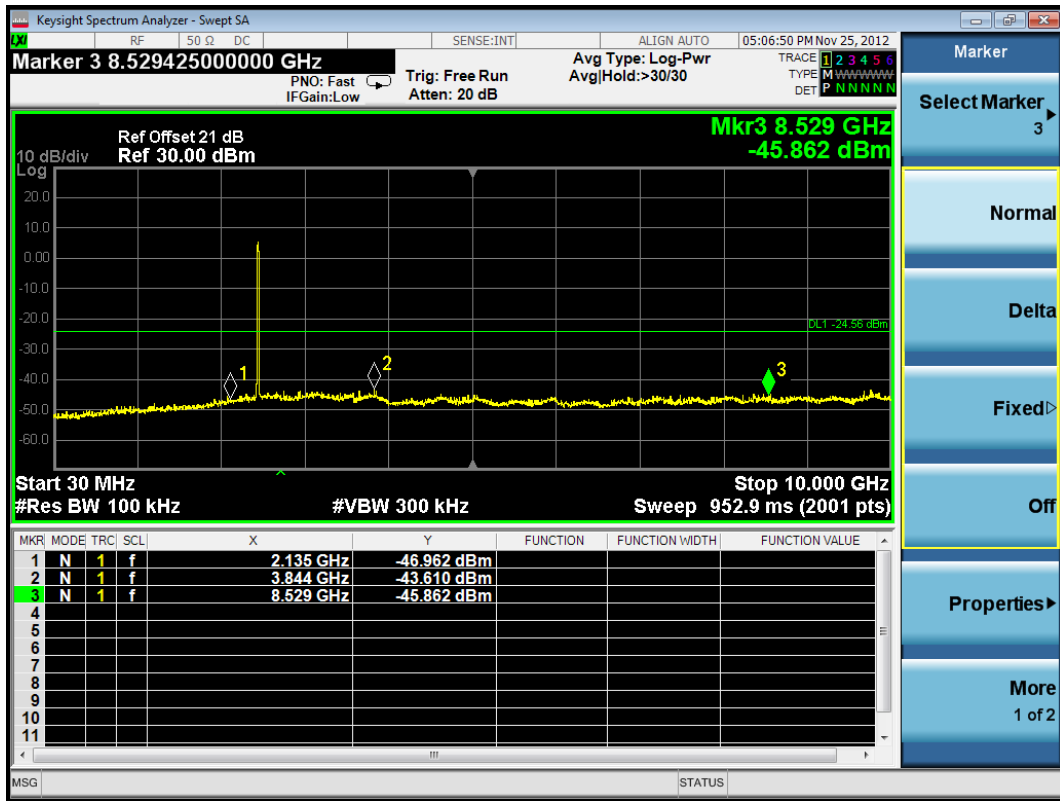
802.11b CH2462MHz

Reference level



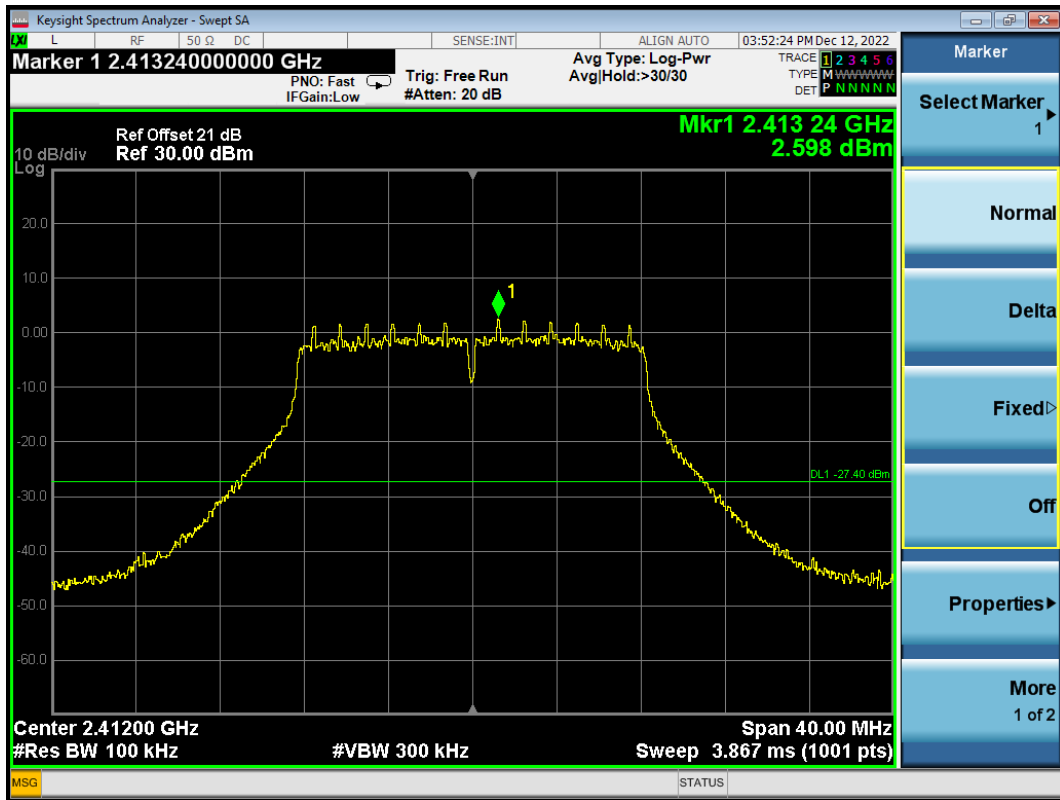
Emission level



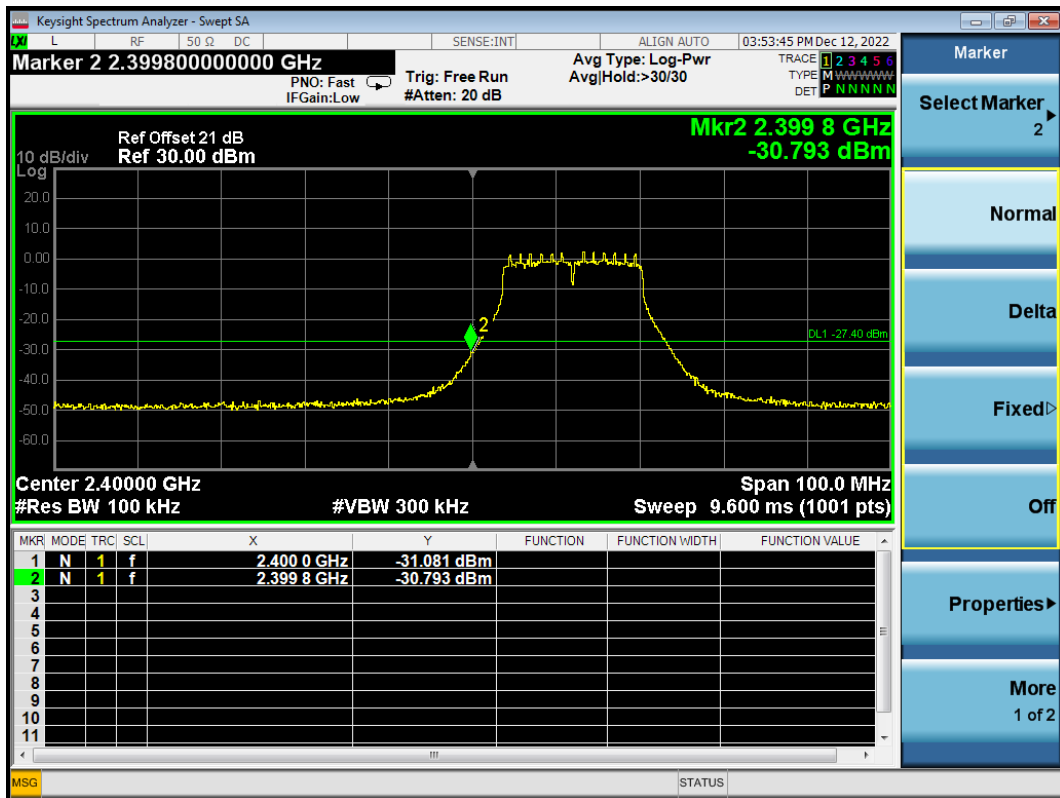


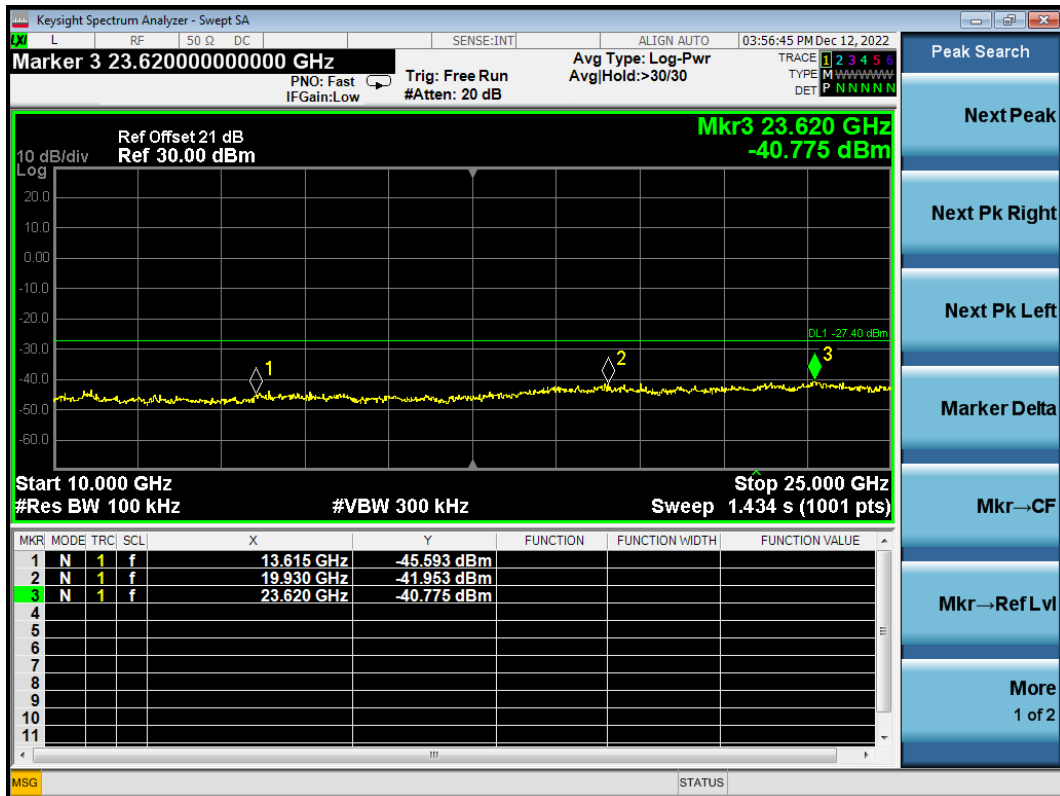
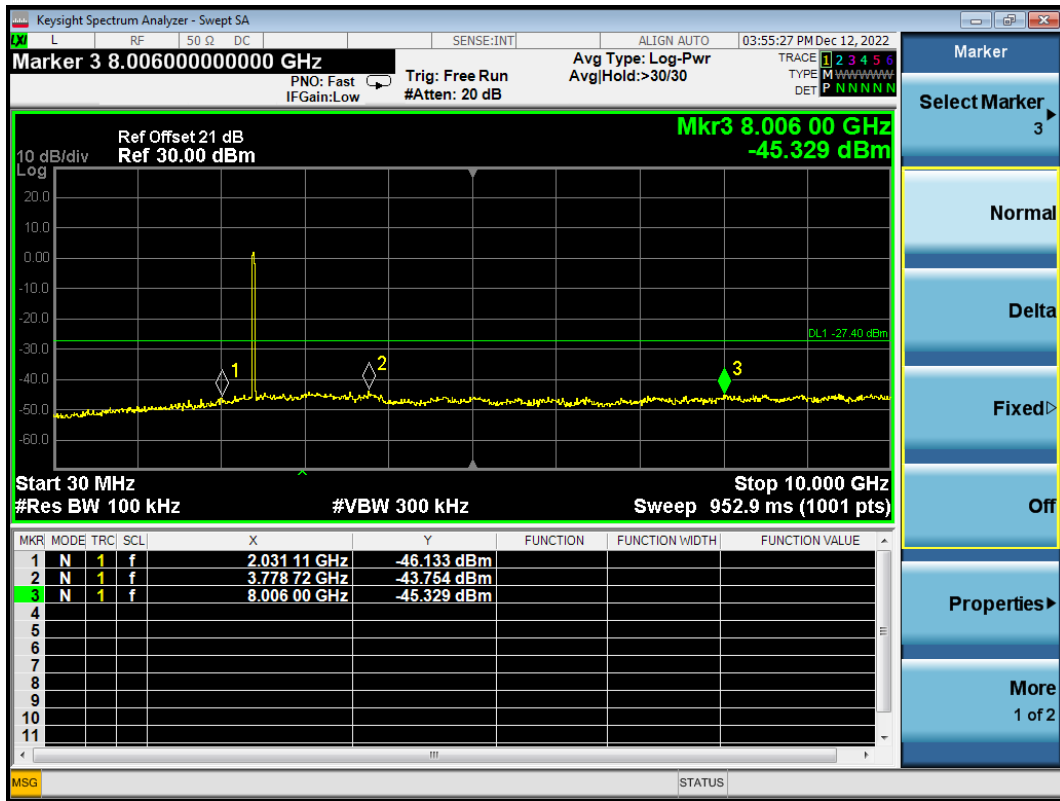
802.11g CH2412MHz

Reference level



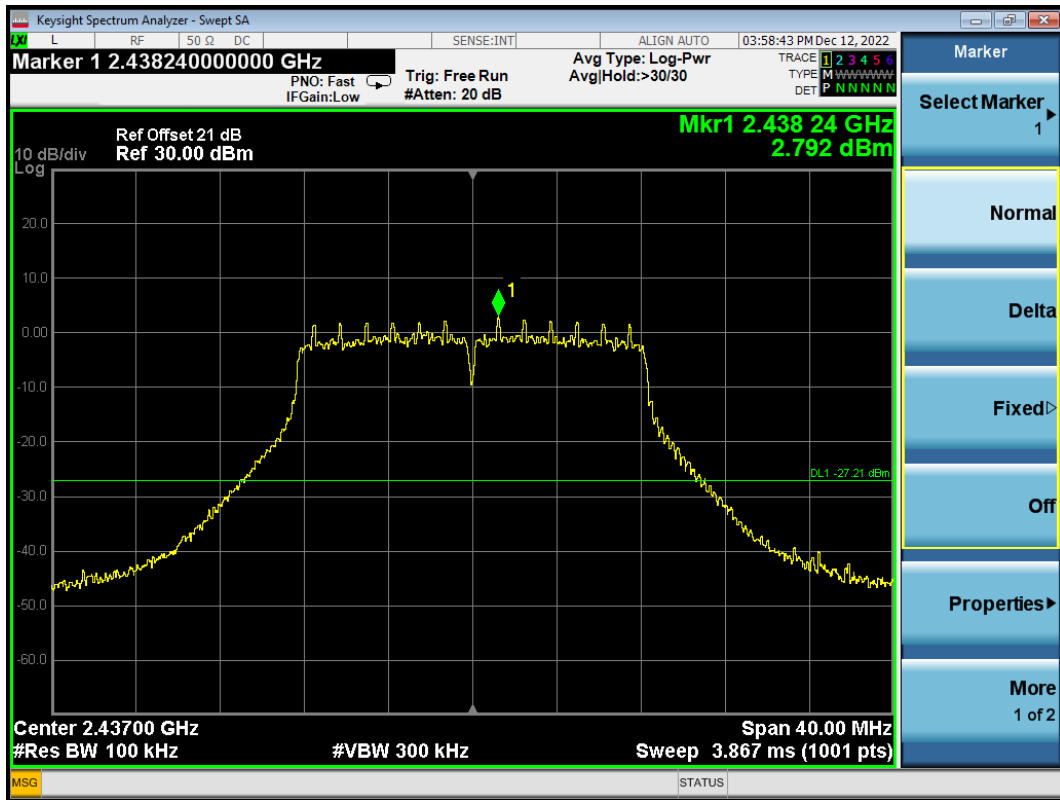
Emission level



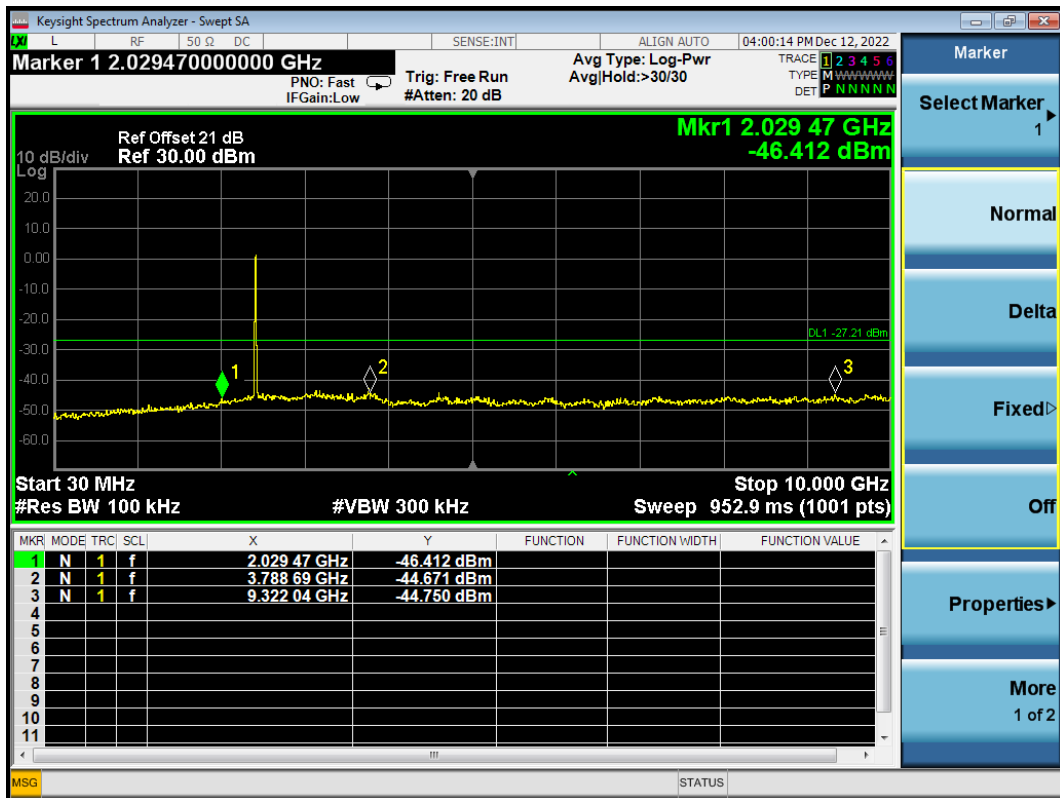


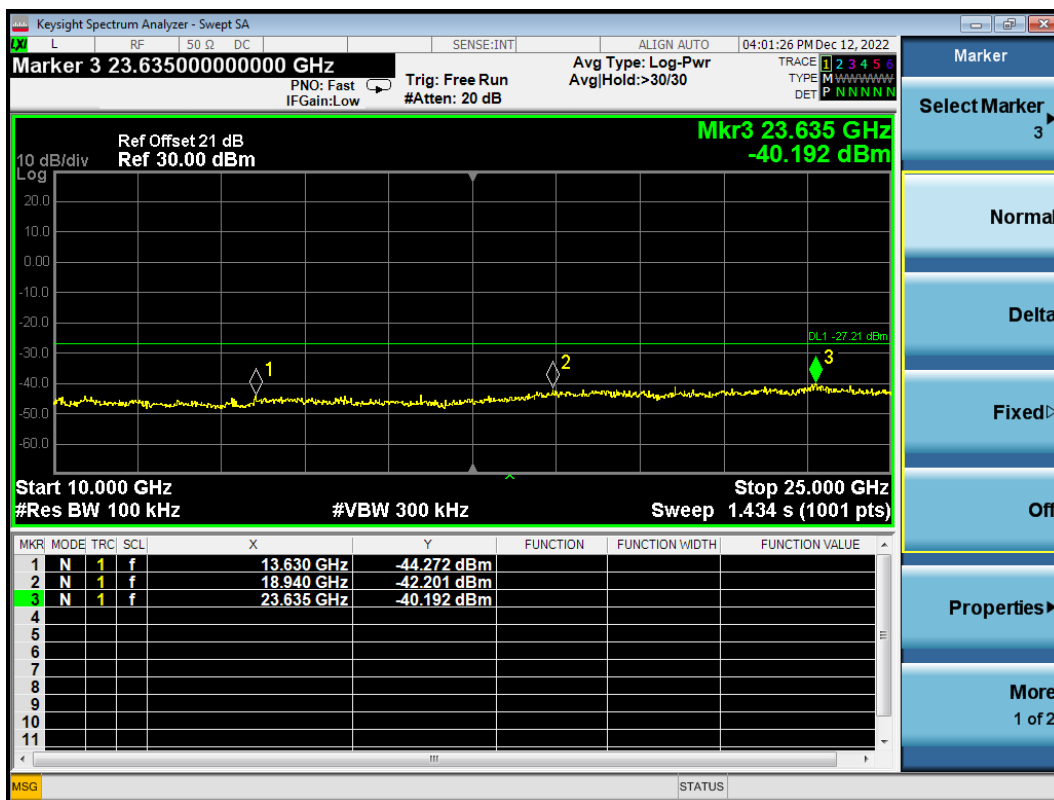
802.11g CH2437MHz

Reference level



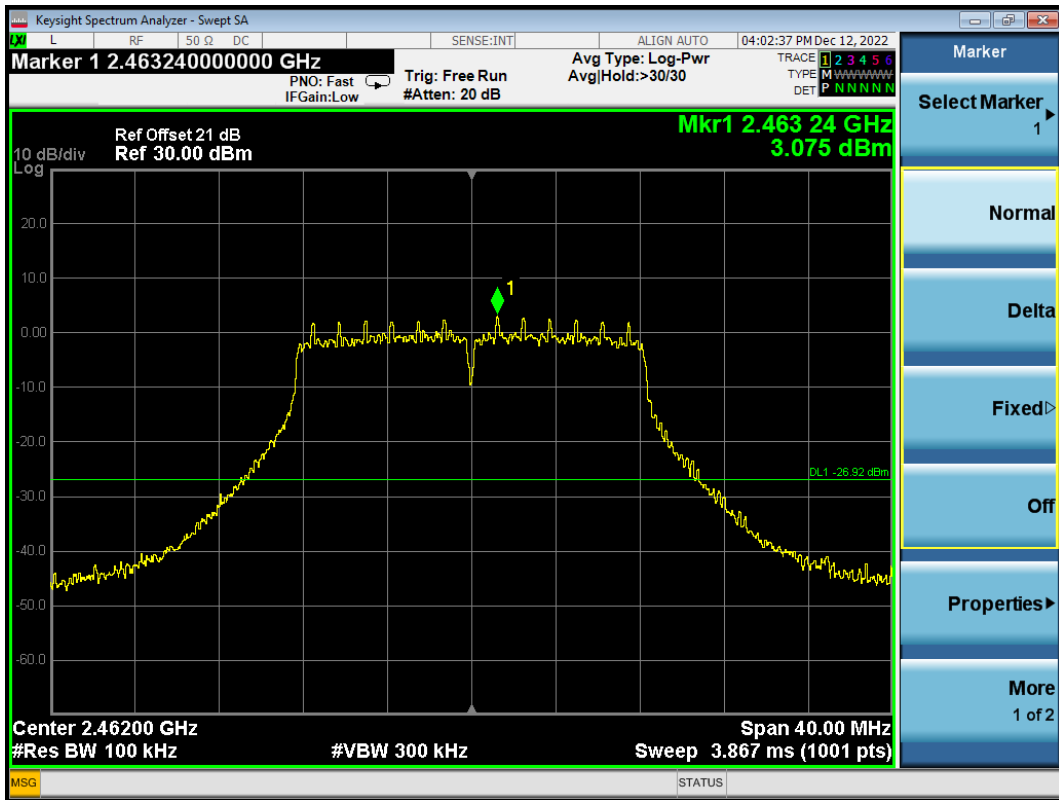
Emission level



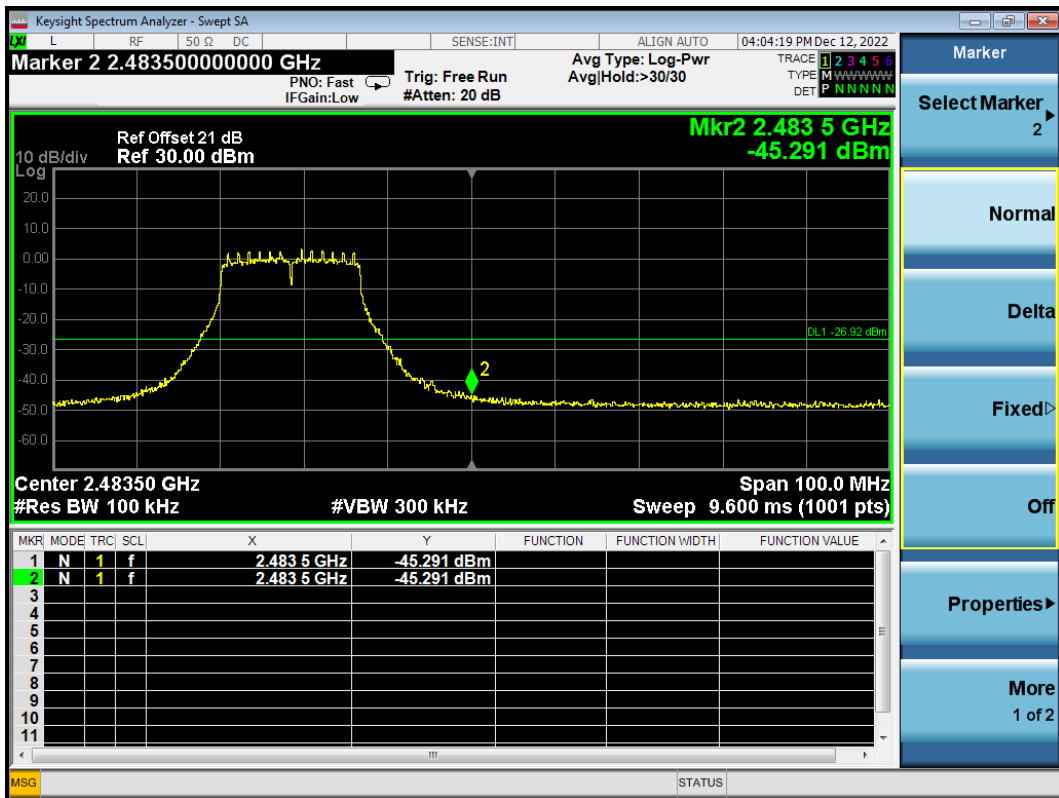


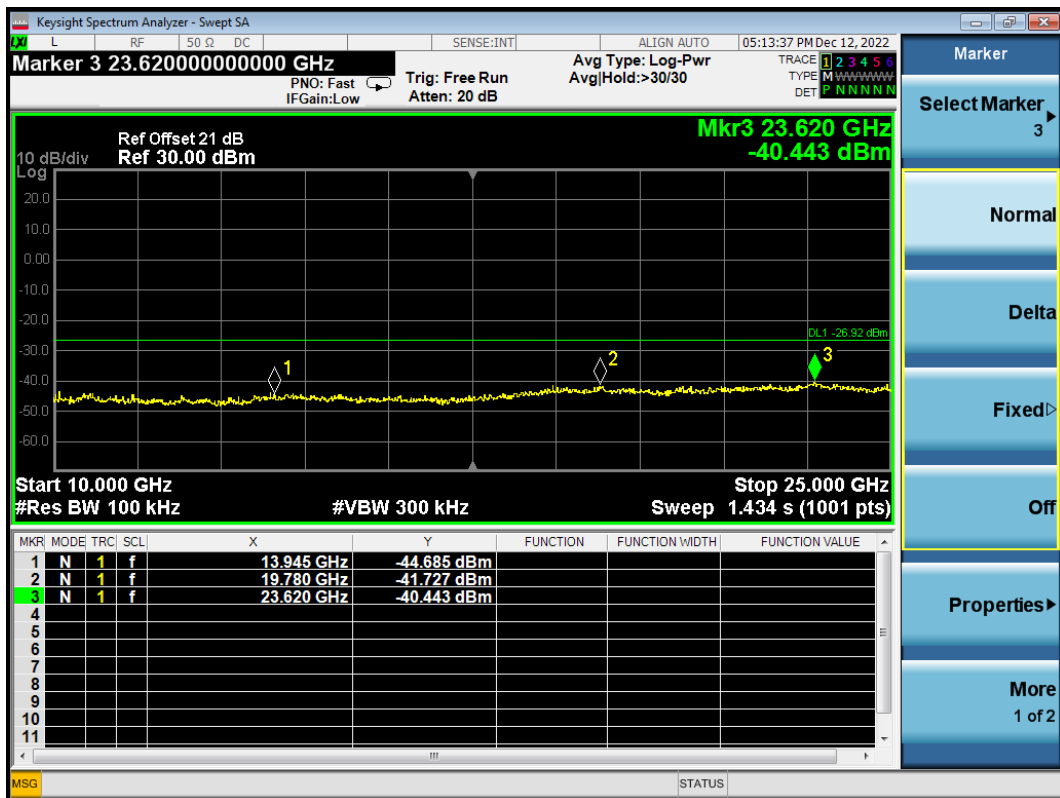
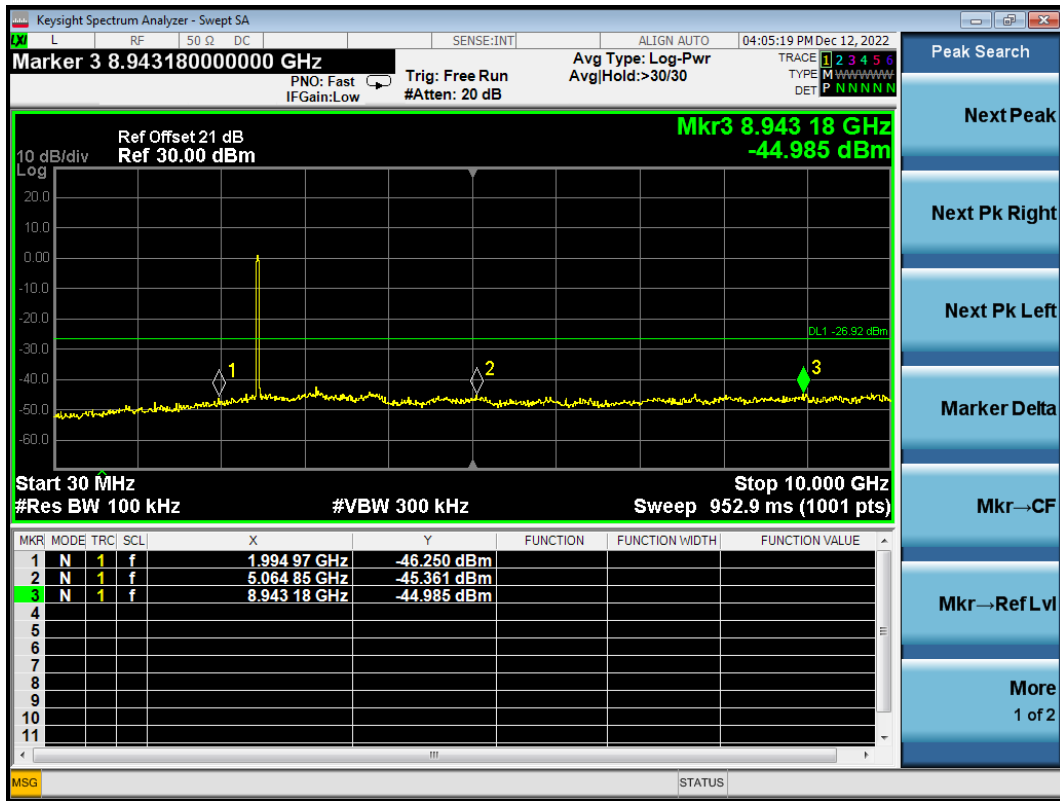
802.11g CH2462MHz

Reference level



Emission level

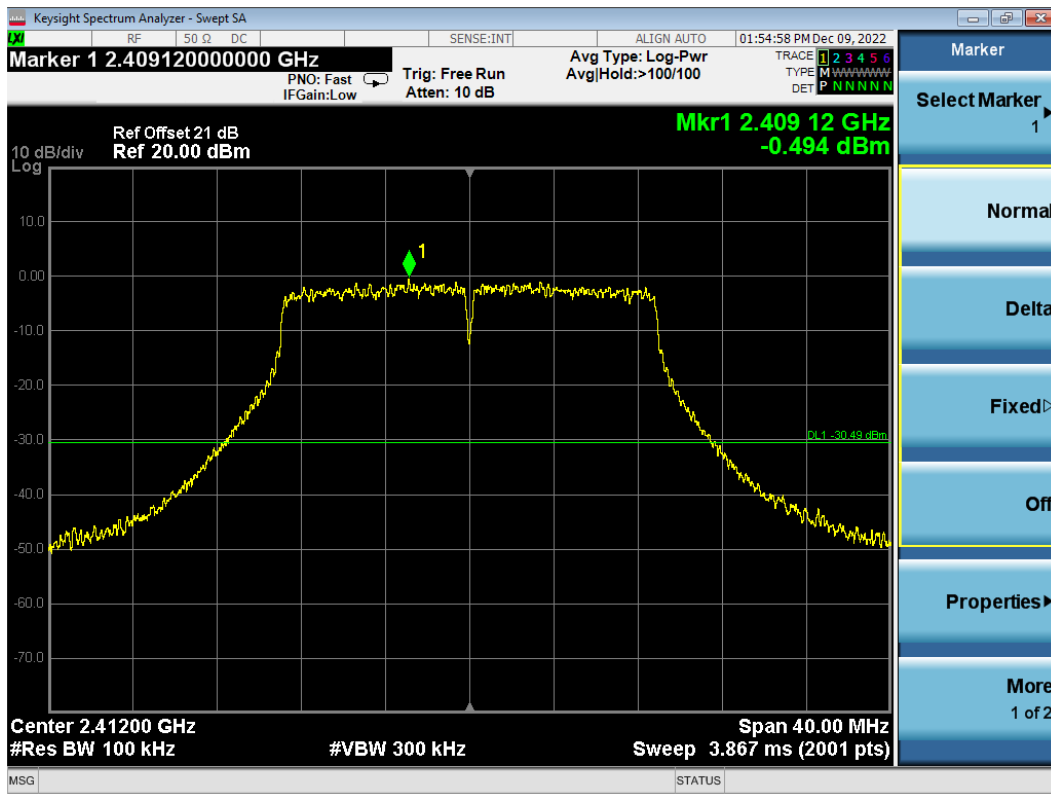




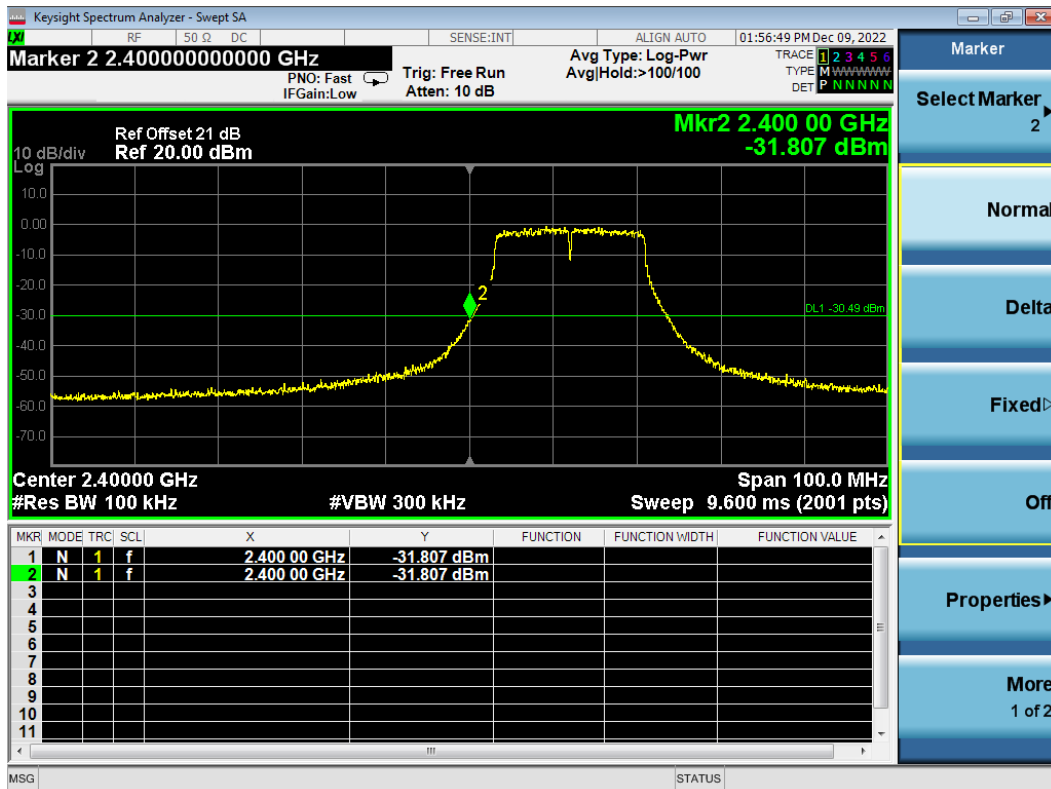


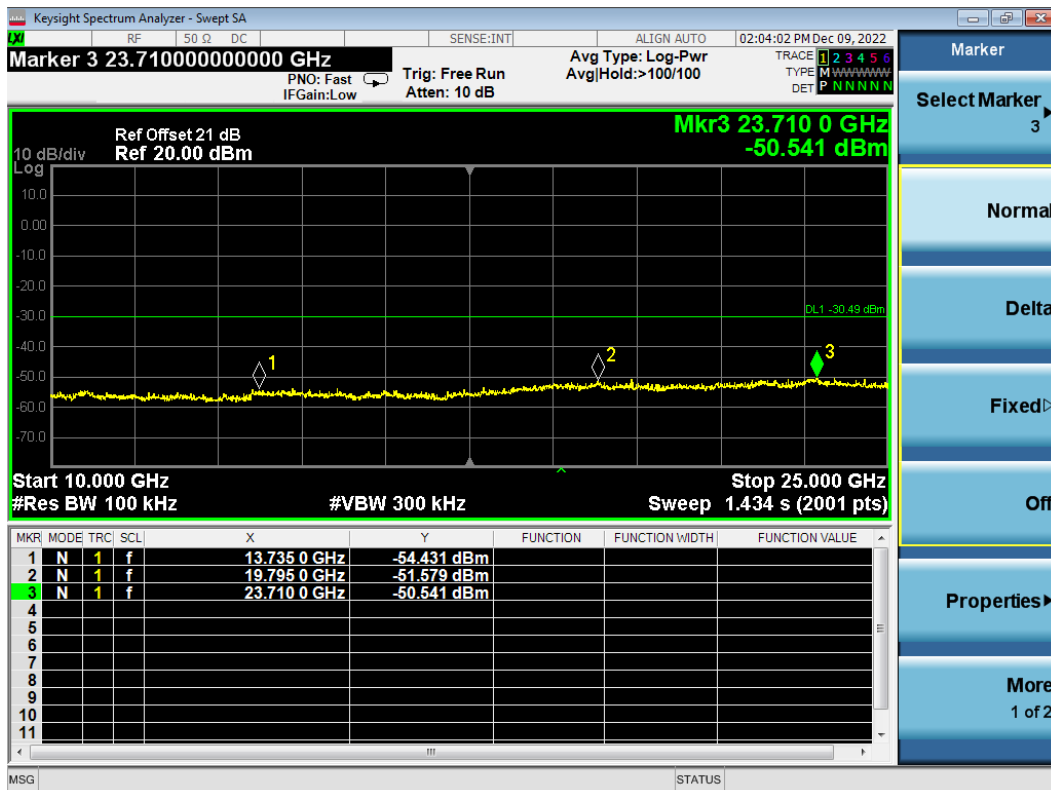
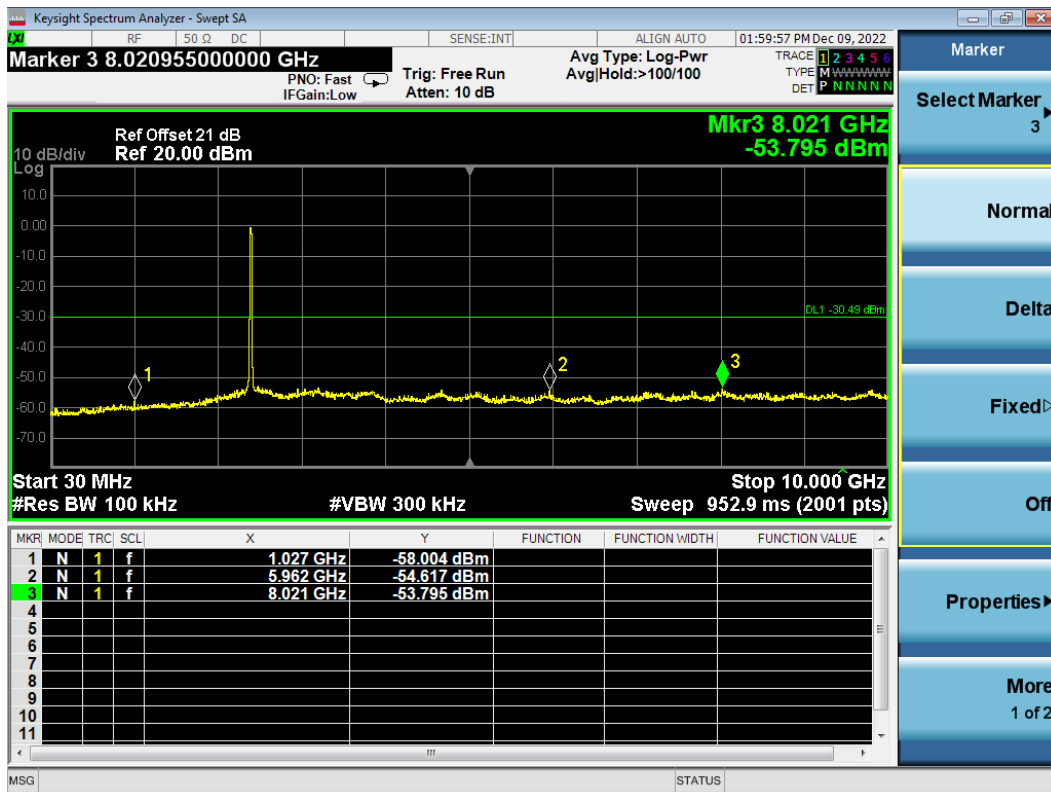
802.11n20 CH2412MHz

Reference level



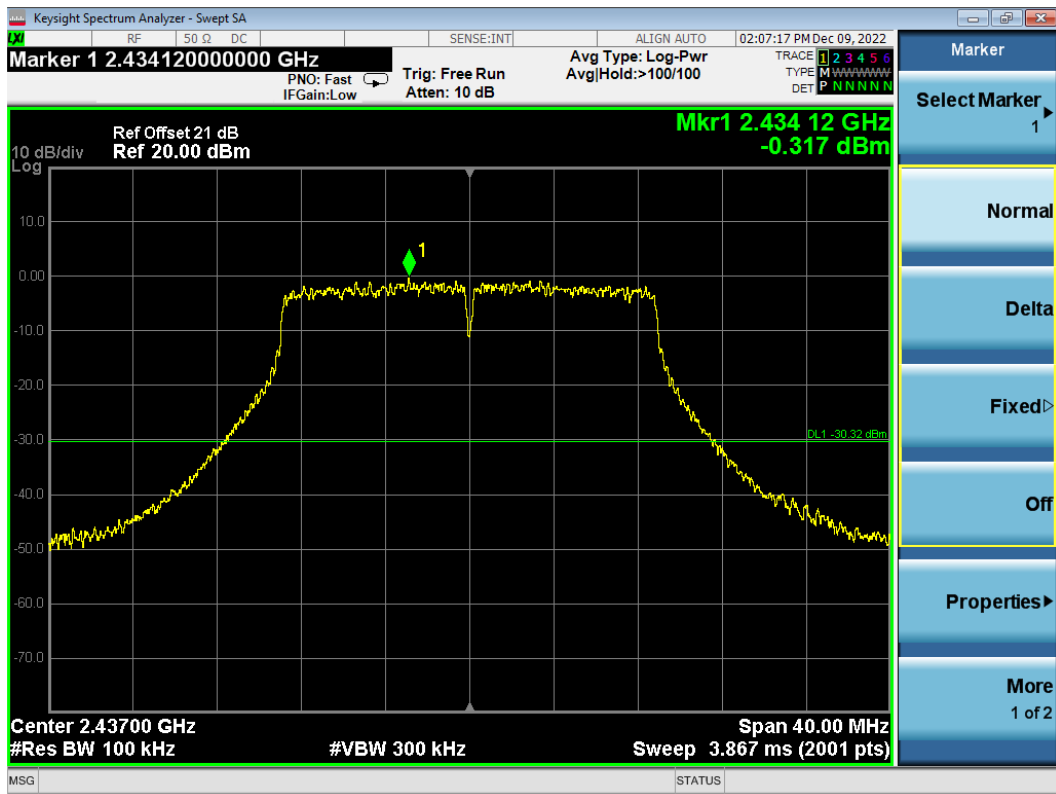
Emission level



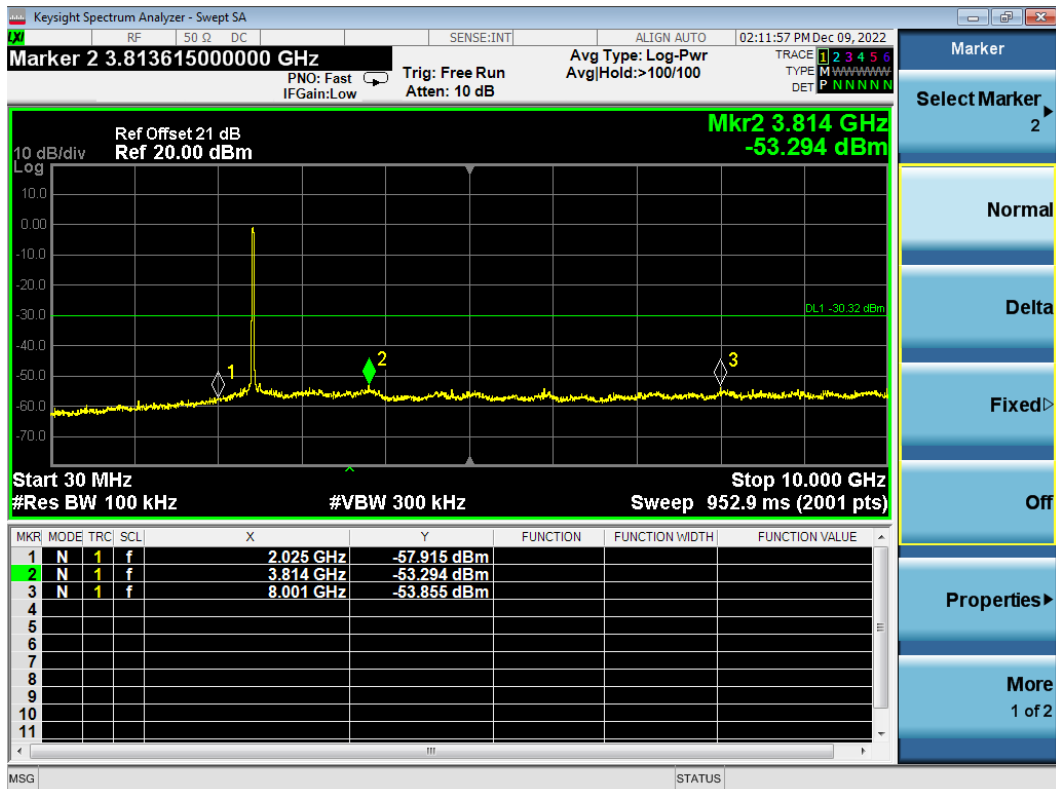


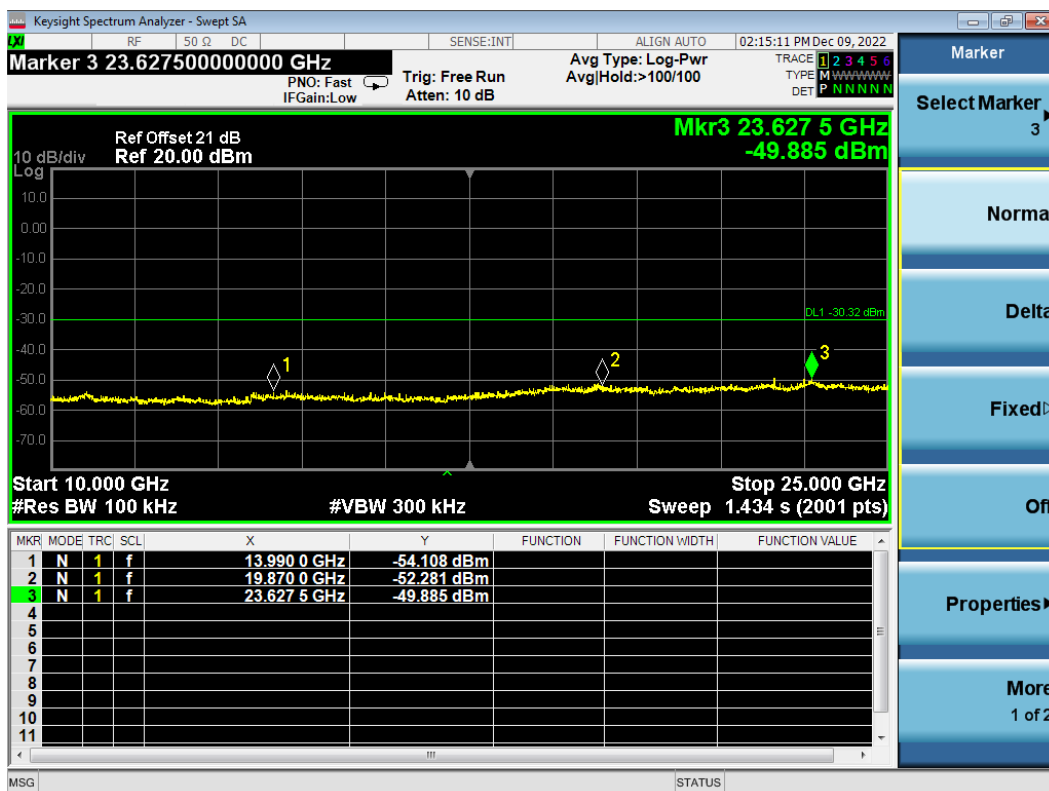
802.11n20 CH2437MHz

Reference level



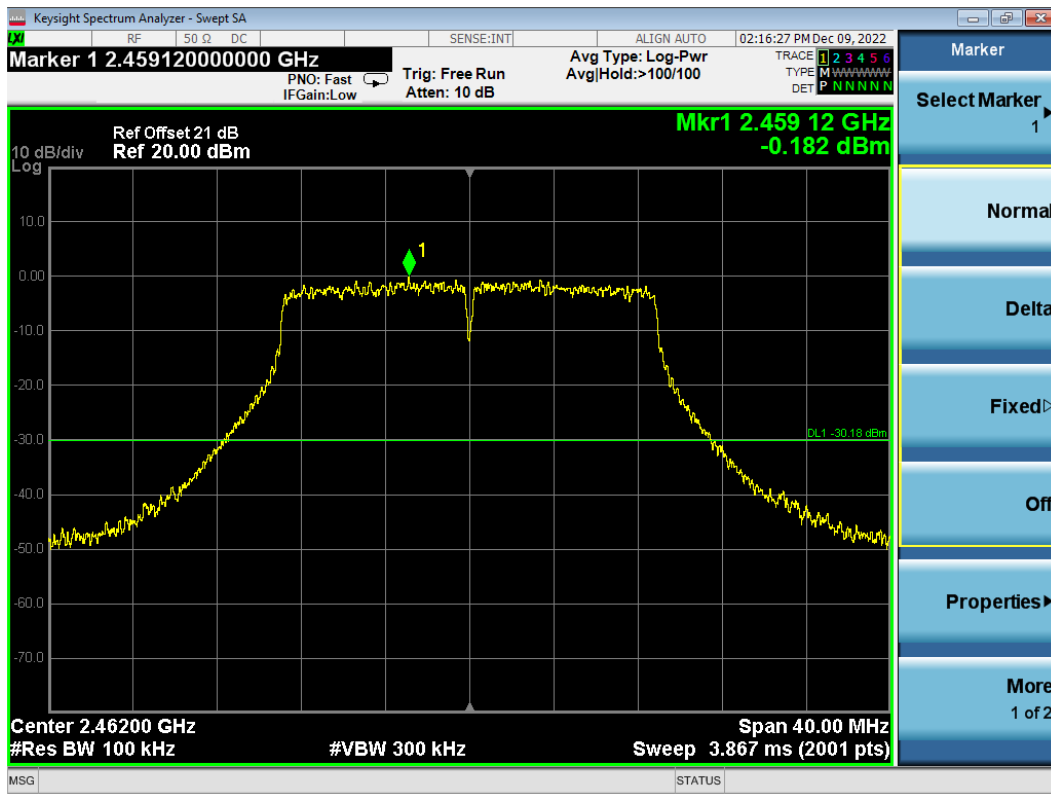
Emission level



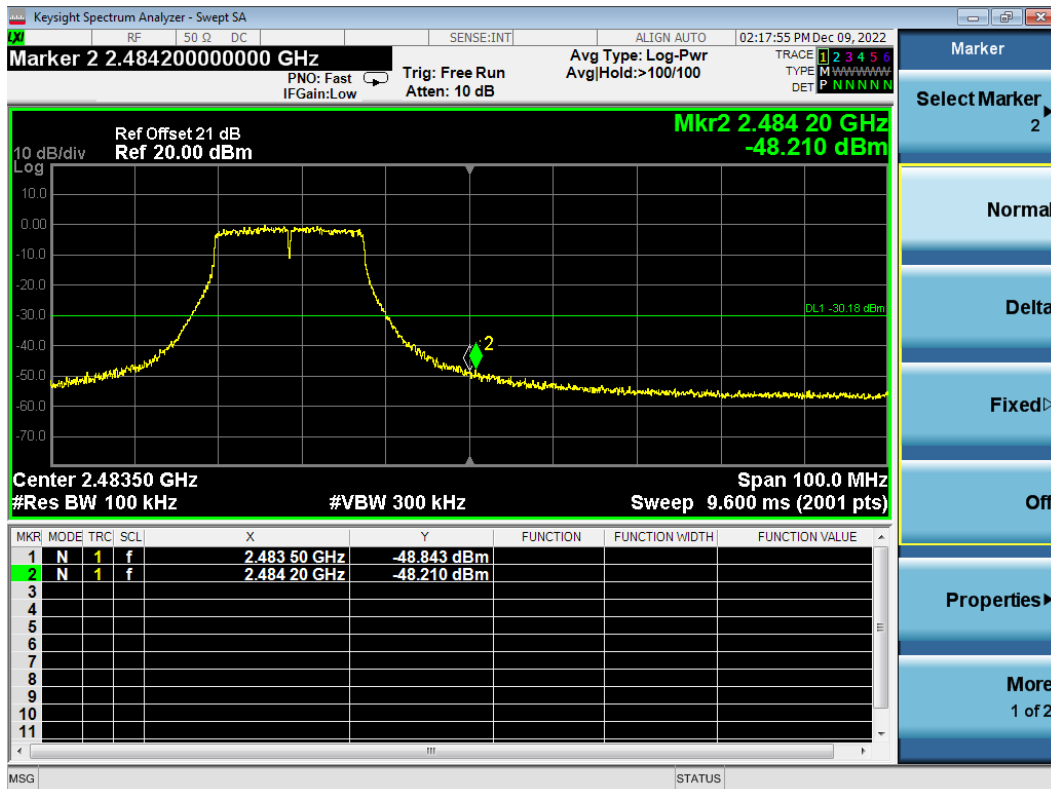


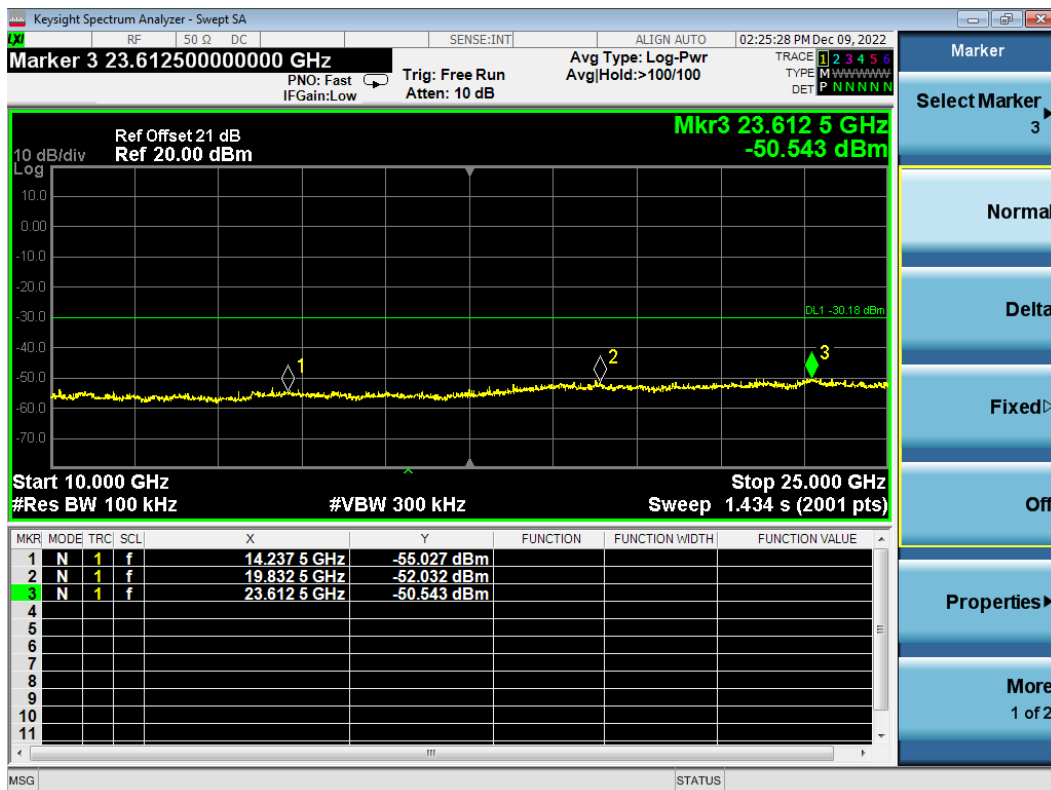
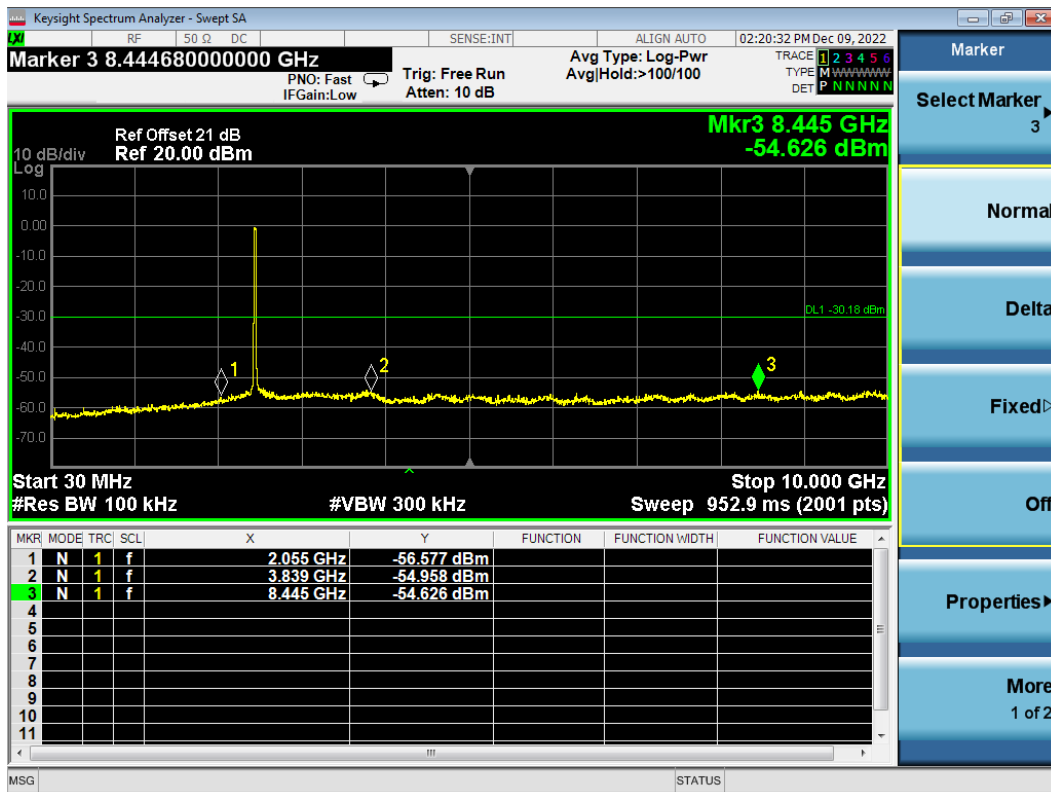
802.11n20 CH2462MHz

Reference level



Emission level





## 9 POWER SPECTRAL DENSITY MEASUREMENT

### 9.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2022.09.15	1 Year
2.	Coaxial Cable	WOKEN	SFL402-105F LEX	F02-150819-045	2022.03.07	1 Year
3.	20 dB Attenuator	Mini-Circuits	VAT-20+	001	2022.08.06	1 Year

### 9.2 Block Diagram of Test Setup

The Same as section 5.2.

### 9.3 Specification Limits (§15.247(e))

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band.

### 9.4 Operating Condition of EUT

The software as section 2.3 was used to enable the EUT to change the test mode one by one.

### 9.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d) Set the VBW  $\geq [3 \times \text{RBW}]$ .
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

The test procedure is defined in ANSI C63.10-2013 ( 11.10.2 Measurement Procedure “Method PKPSD (peak PSD)” was used).

## 9.6 Test Results

### **PASSED.**

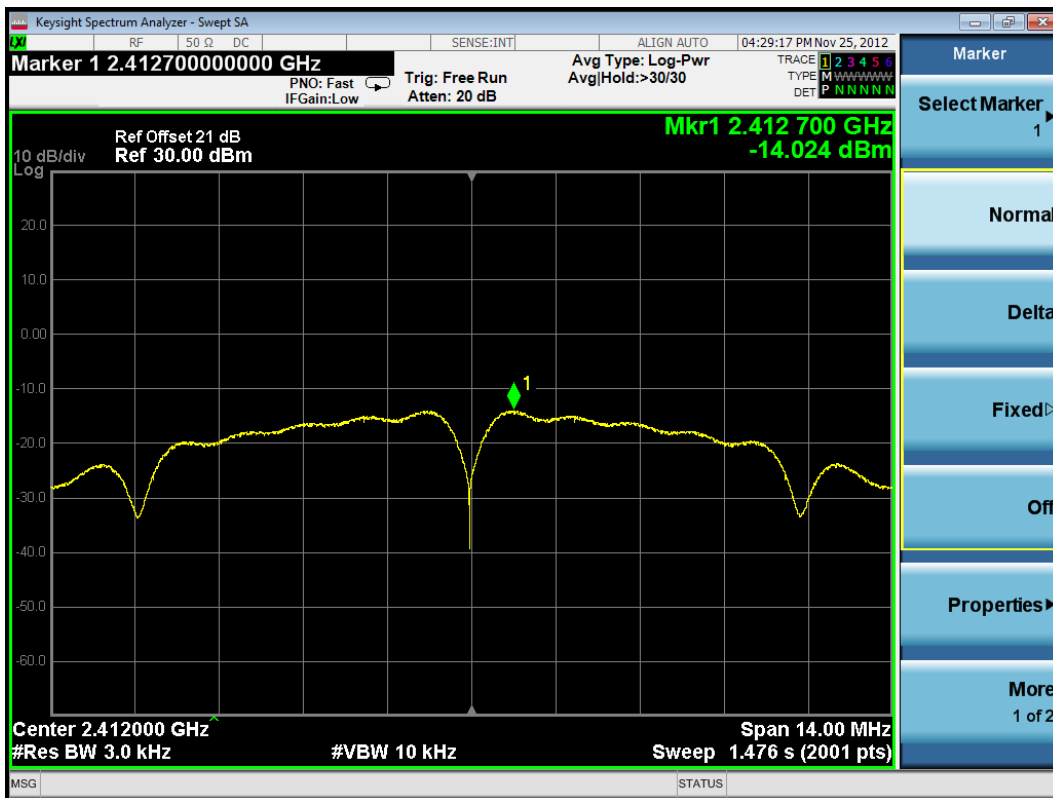
All the test results are attached in next pages.

(Test Date: 2022.11.24-25 Temperature: 23°C Humidity: 51 %)

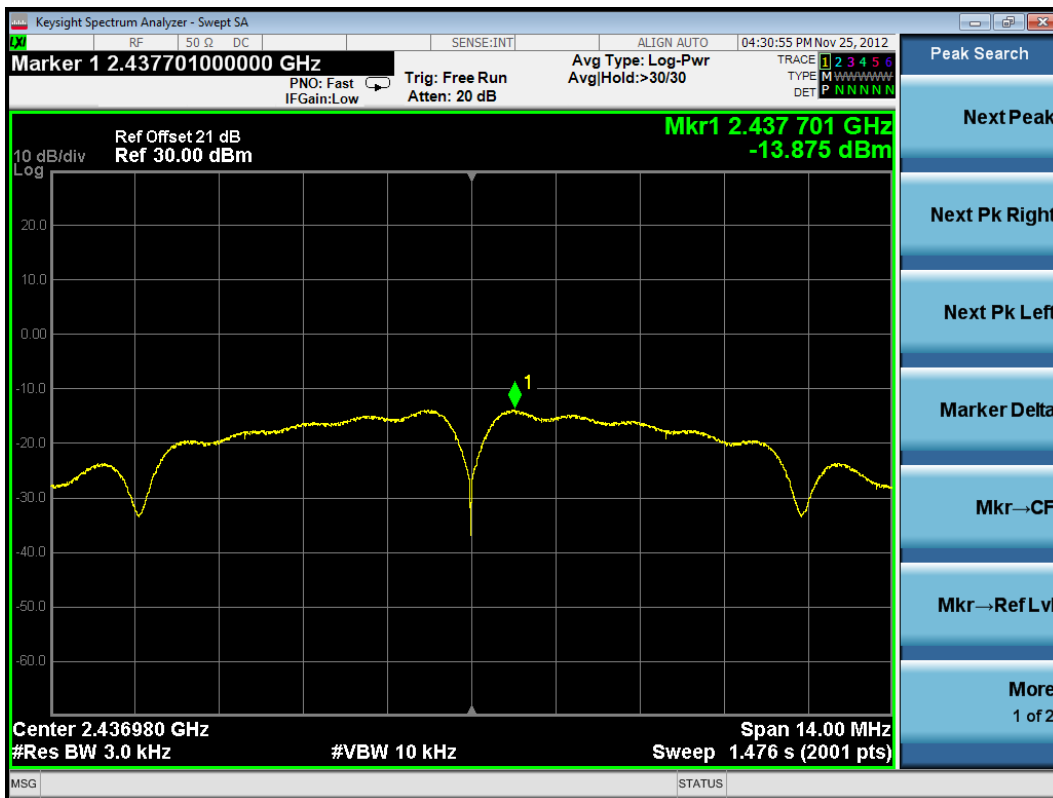
Modulation	Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit
802.11b	1	2412	<b>-14.024</b>	8 dBm
	6	2437	<b>-13.875</b>	8 dBm
	11	2462	<b>-14.682</b>	8 dBm
802.11g	1	2412	<b>-11.358</b>	8 dBm
	6	2437	<b>-11.603</b>	8 dBm
	11	2462	<b>-11.982</b>	8 dBm
802.11n20	1	2412	<b>-14.803</b>	8 dBm
	6	2437	<b>-14.688</b>	8 dBm
	11	2462	<b>-14.421</b>	8 dBm



### 802.11b CH2412 MHz



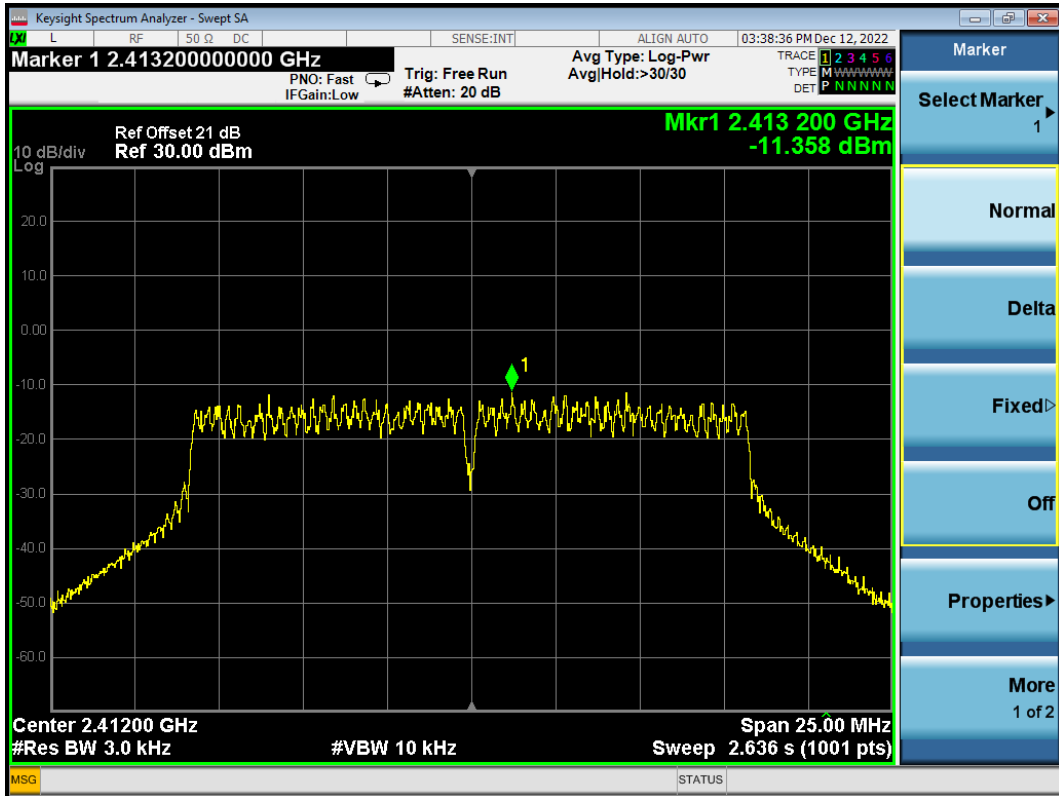
### 802.11b CH2442 MHz



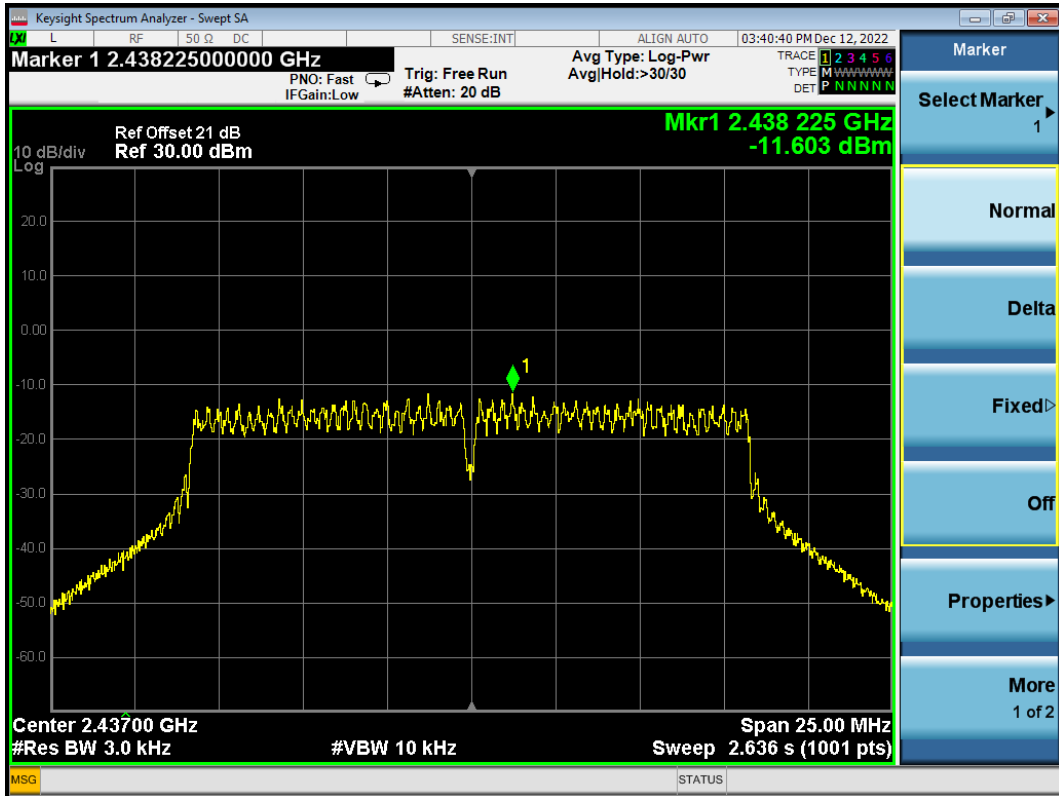
### 802.11b CH2462 MHz



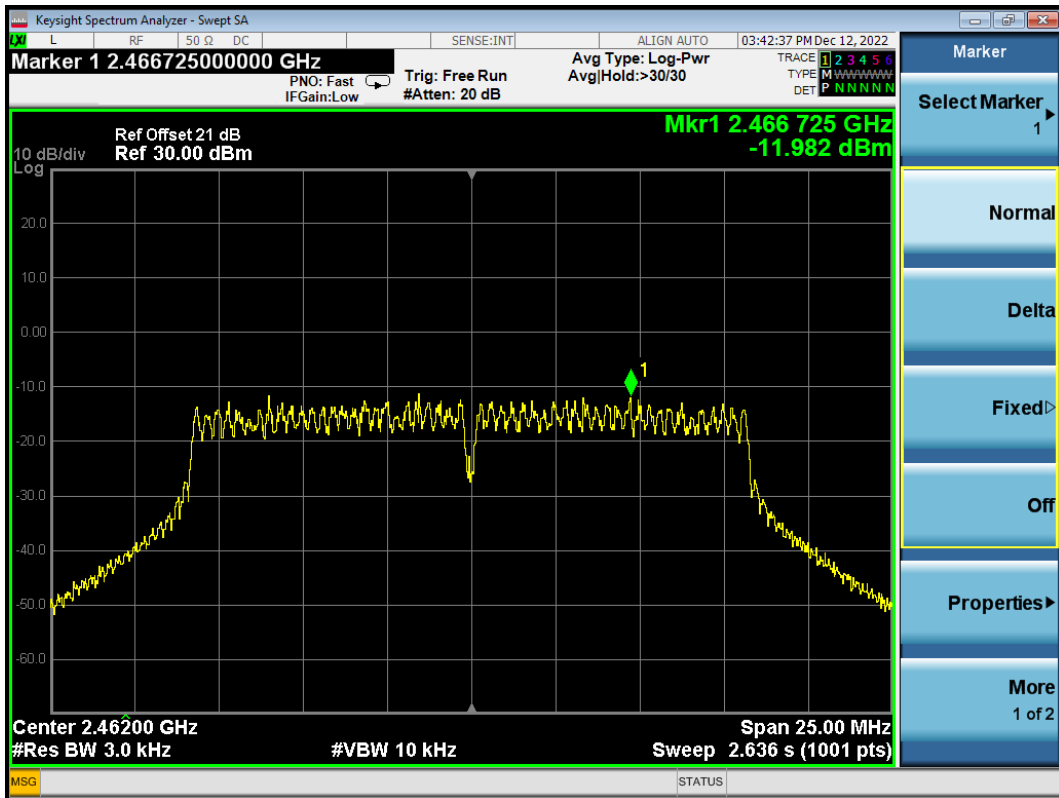
### 802.11g CH2412 MHz



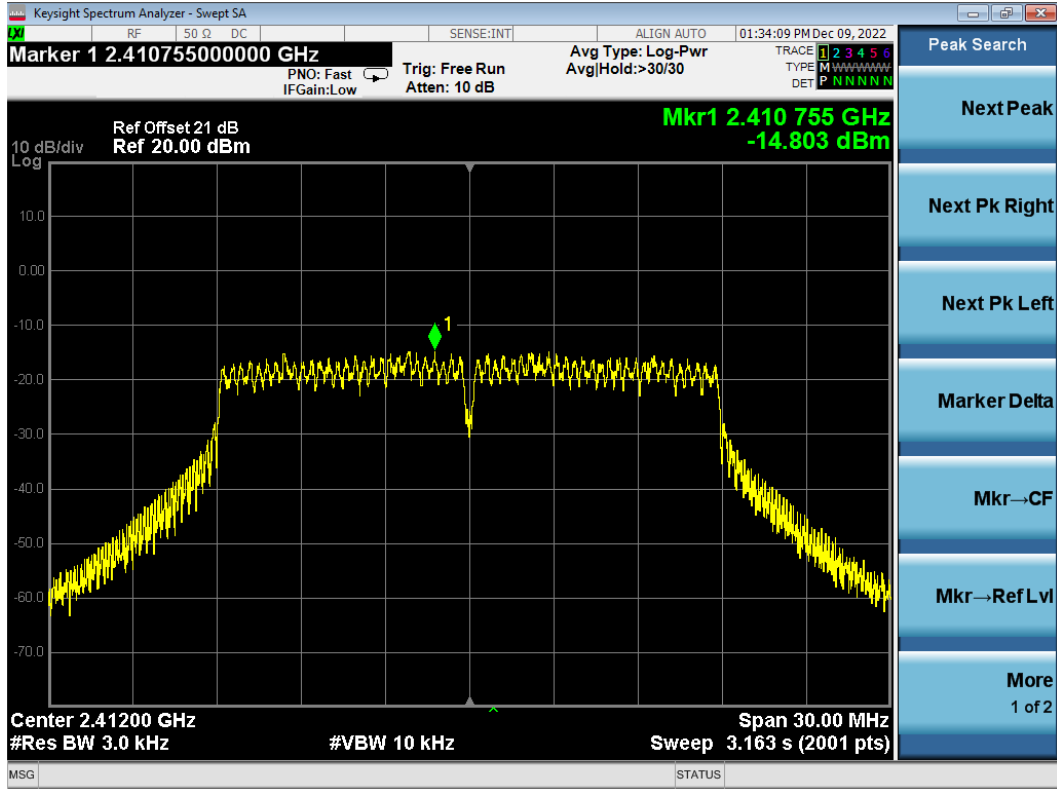
### 802.11g CH2437 MHz



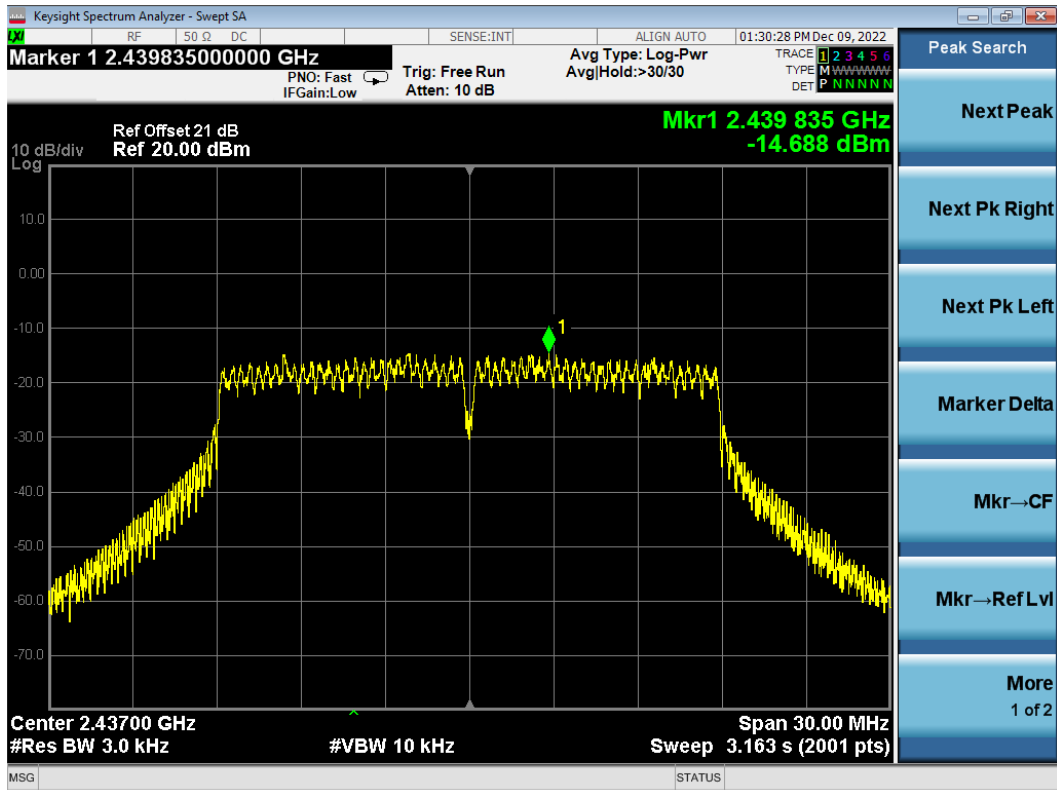
### 802.11g CH2462 MHz



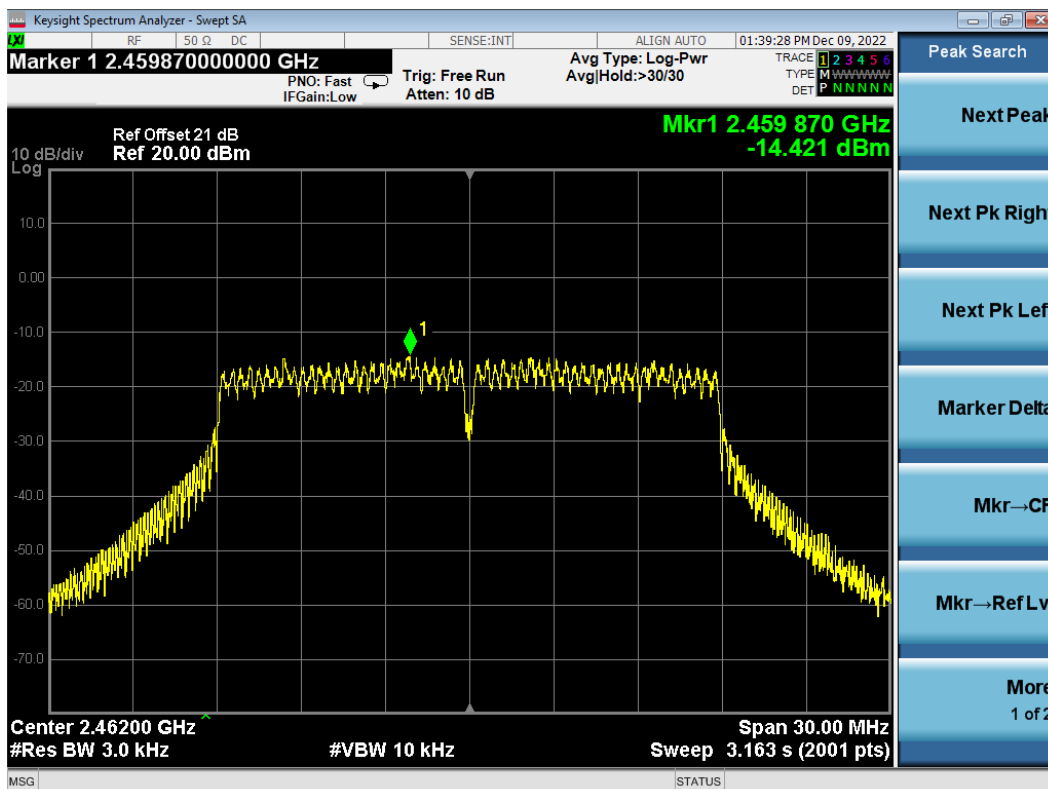
### 802.11n20 CH2412 MHz



### 802.11n20 CH2437 MHz



### 802.11n20 CH2462 MHz



## 10 ANTENNA REQUIREMENT

### 10.1 Specification Limits (§15.203)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### 10.2 Result

According to KDB 353028 D1, the following describes the three ways that can be used to demonstrate compliance to Section 15.203:

- a) Antenna permanently attached.
- b) Unique (non-standard) antenna connector.
- c) Professional installation.

For this product, the antenna is:

- Antenna permanently attached
- Unique (non-standard) antenna connector
- Professional installation
- not meet any of ways list above

that

- compliant
- not compliant

with the requirement of Section 15.203.

## **11 DEVIATION TO TEST SPECIFICATIONS**

None.

## 12 MEASUREMENT UNCERTAINTY LIST

The measurement uncertainty was estimated for test on the EUT according to CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage of K=2.

The uncertainties value is not used in determining the PASS/FAIL results.

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Conducted Emission No.1 Shielded Room	9kHz~150kHz	±3.1 dB
	150kHz~30MHz	±2.6 dB
Conducted Emission No.3 Shielded Room	9kHz~150kHz	±3.1 dB
	150kHz~30MHz	±2.6 dB
Radiated Emission	30MHz~200MHz, Horizontal	±3.8 dB
	30MHz~200MHz, Vertical	±4.1 dB
	200MHz~1000MHz, Horizontal	±3.6 dB
	200MHz~1000MHz, Vertical	±5.1 dB
	1GHz~6GHz	±5.3 dB
	6GHz~18GHz	±5.3 dB
	18GHz~40GHz	±3.5 dB
Output Power Test	50MHz~18GHz	0.77 dB
Power Density Test	9kHz~6GHz	1.08 dB
RF Frequency Test	9kHz~40GHz	$6 \times 10^{-4}$
Bandwidth Test	9kHz~6GHz	$1.5 \times 10^{-3}$
RF Radiated Power Test	30MHz~1000MHz	3.06 dB
Conducted Output Power Test	50MHz~18GHz	0.83 dB
AC Voltage(<10kHz) Test	120V~230V	0.04 %
DC Power Test	0V~30V	0.4 %
Temperature	-40°C~+100°C	0.52 °C
Humidity	30%~95%	2.6 %